

21 REVIEWS • HARD DRIVES • WORD PROCESSORS • VIDEO • ONLINE

# MACWORLD

The Macintosh® Magazine

September 1990 \$3.95 Canada \$4.95

## THE BEST

# 44

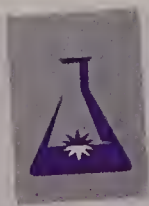
FRONT  
DESK

## MAC PRODUCTS

*Readers choose the winners  
of our 4th annual World-Class Awards Contest*

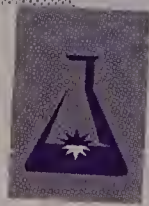


# Some think there's no a Microsoft applications. T the same thing abo



## Nobell Chem Revenue Potential Product Portfolio Breakout

	1989	1990	1991	1992
<b>High Growth Markets</b>				
Medical Applications	15	25	40	60
Industrial Applications	30	39	46	51
<b>Total</b>	<b>45</b>	<b>64</b>	<b>86</b>	<b>111</b>
% of total	55%	63%	68%	72%
<b>Mature Markets</b>				
Defense Applications	36	38	40	42
% of total	45%	37%	32%	28%
<b>Total Revenue</b>	<b>81</b>	<b>102</b>	<b>126</b>	<b>153</b>



N o b e l l C h e m

Report to the Board of Trustees

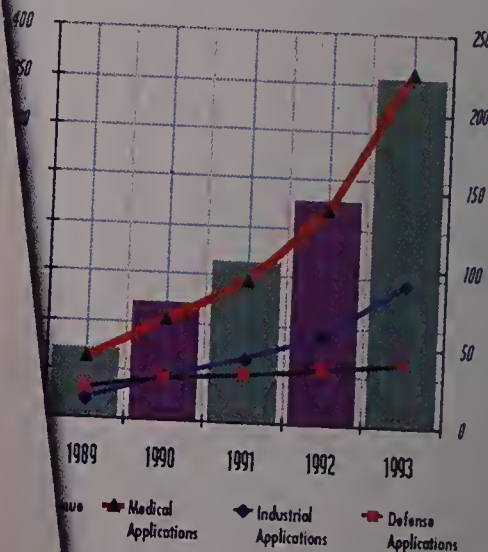
During the past twelve months, the Nobell Chem Corporation pulled far ahead of the competition, through the diverse and strategic marketing of its Nitro Glycerin compound.

Nitro Glycerin, which was discovered in 1847 by Ascanio Sobrero and commercially developed by Alfred Nobel (Nobel Prize fame), has long been used in the manufacturing process of dynamite.

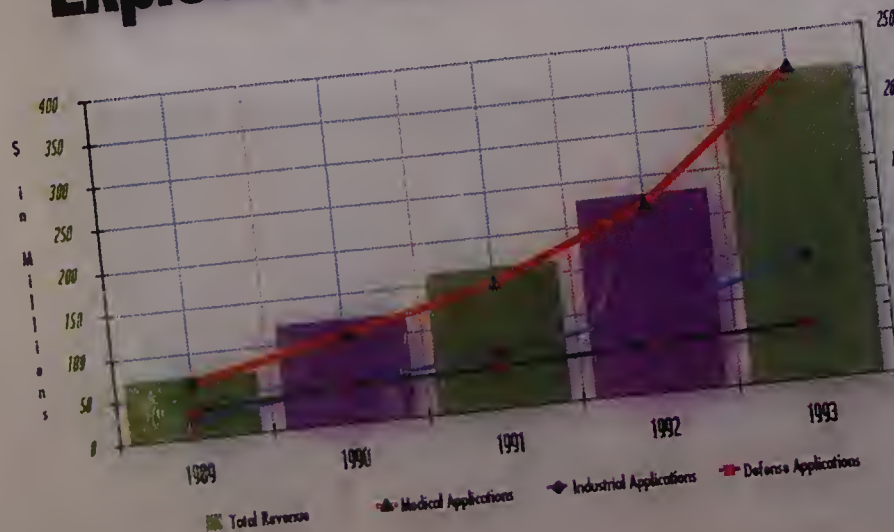
Nobell Chem now become a leading marketer of Nitro Glycerin in pill form, to aid in various medical uses. As a result of this development, Nobell Chem is now expanding its distribution channels.

1989	1990	1991	1992	1993
15	25	40	60	85
30	39	46	51	72
36	38	40	42	44
<b>81</b>	<b>102</b>	<b>126</b>	<b>153</b>	<b>201</b>

## Explosive Growth Potential



## Explosive Growth Potential





# Advantage to combining men again, some thought at nitro and glycerin.

If you own a Mac® you may already know what a phenomenally powerful piece of software Microsoft® Word is.

And, most likely, you're also aware of how powerful Microsoft Excel is. Well here's something you probably don't know:

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This is where warm links saves the day (or the hour). No more antiquated manual moves of opening and closing your document, cutting, pasting and praying. With warm links, you simply open your Word document and select Update Link. Word automatically finds the latest Excel data and updates

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As you probably know, Microsoft and the Macintosh have an unusually close relationship. We've been involved with the Mac since the beginning. Which means we know how to get the most out of it, now. So, if you want to coax ever more capability from your Macintosh, depend on these and the rest of the Microsoft line of business applications, that are always designed to get a powerful reaction from each other. And your Macintosh.

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Show ¶	⌘Y
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Update Link	⇧⌘F3

After you update your data in Microsoft Excel, select "update link" from Word's edit menu, and the change will automatically appear elsewhere.



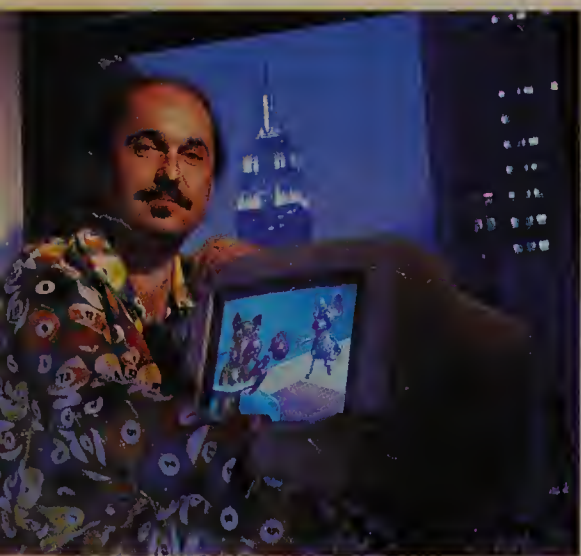
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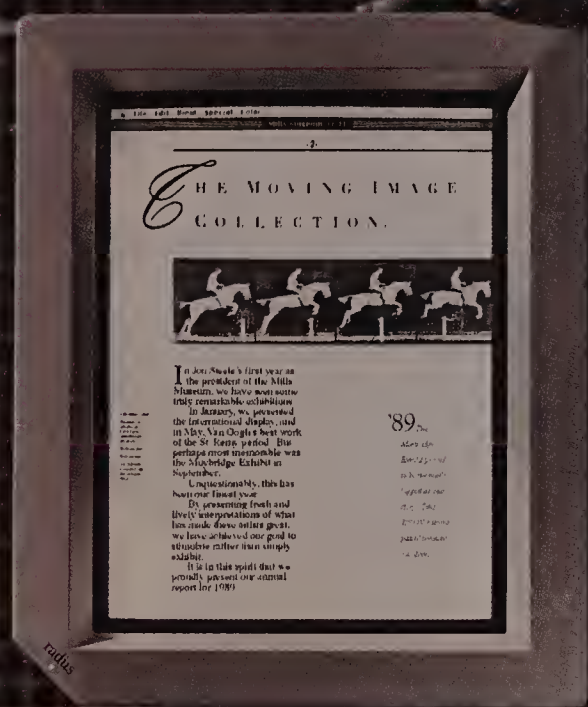
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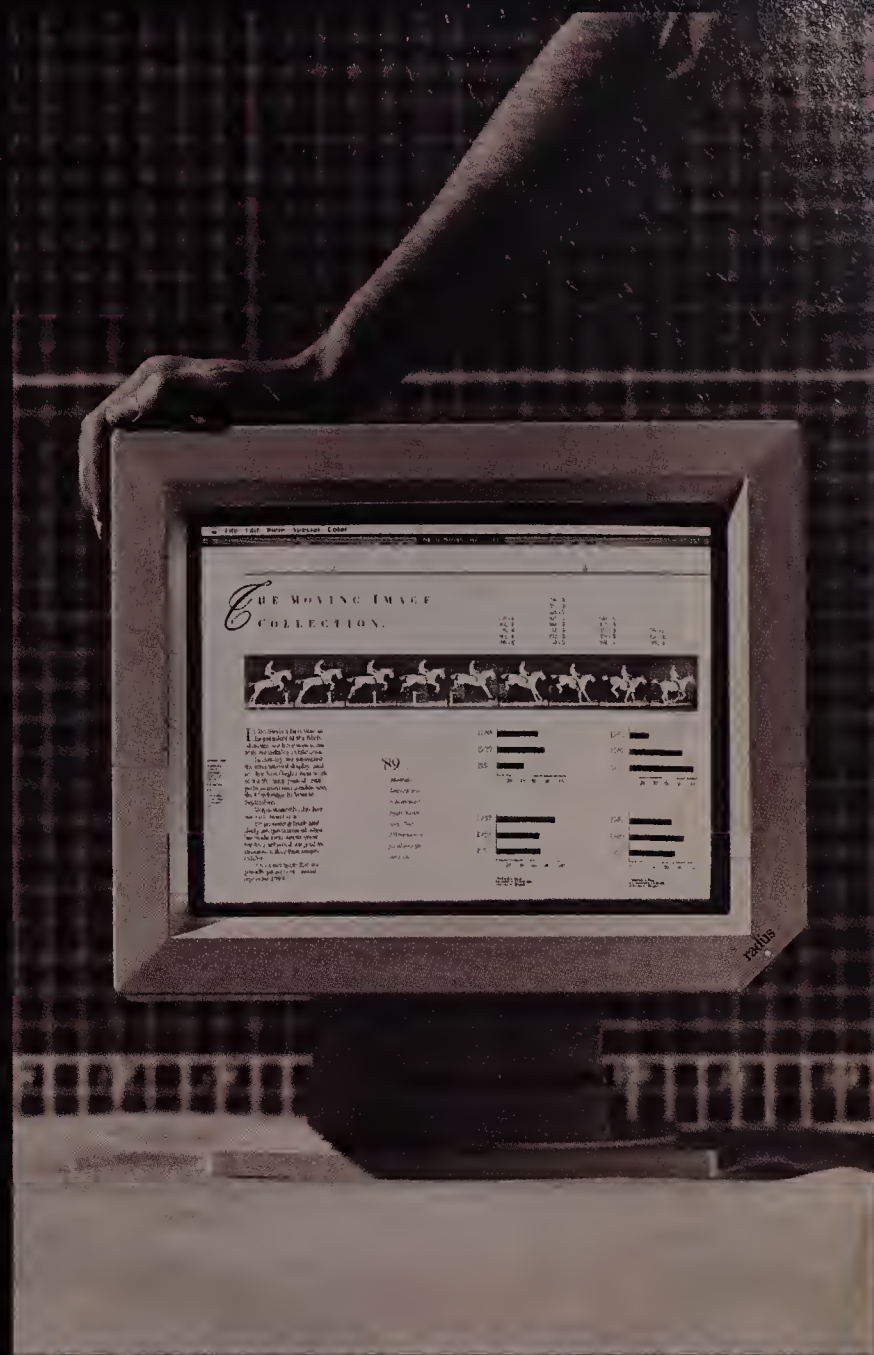
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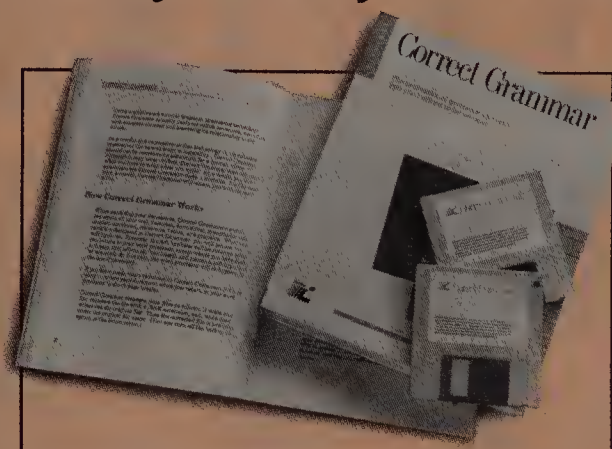
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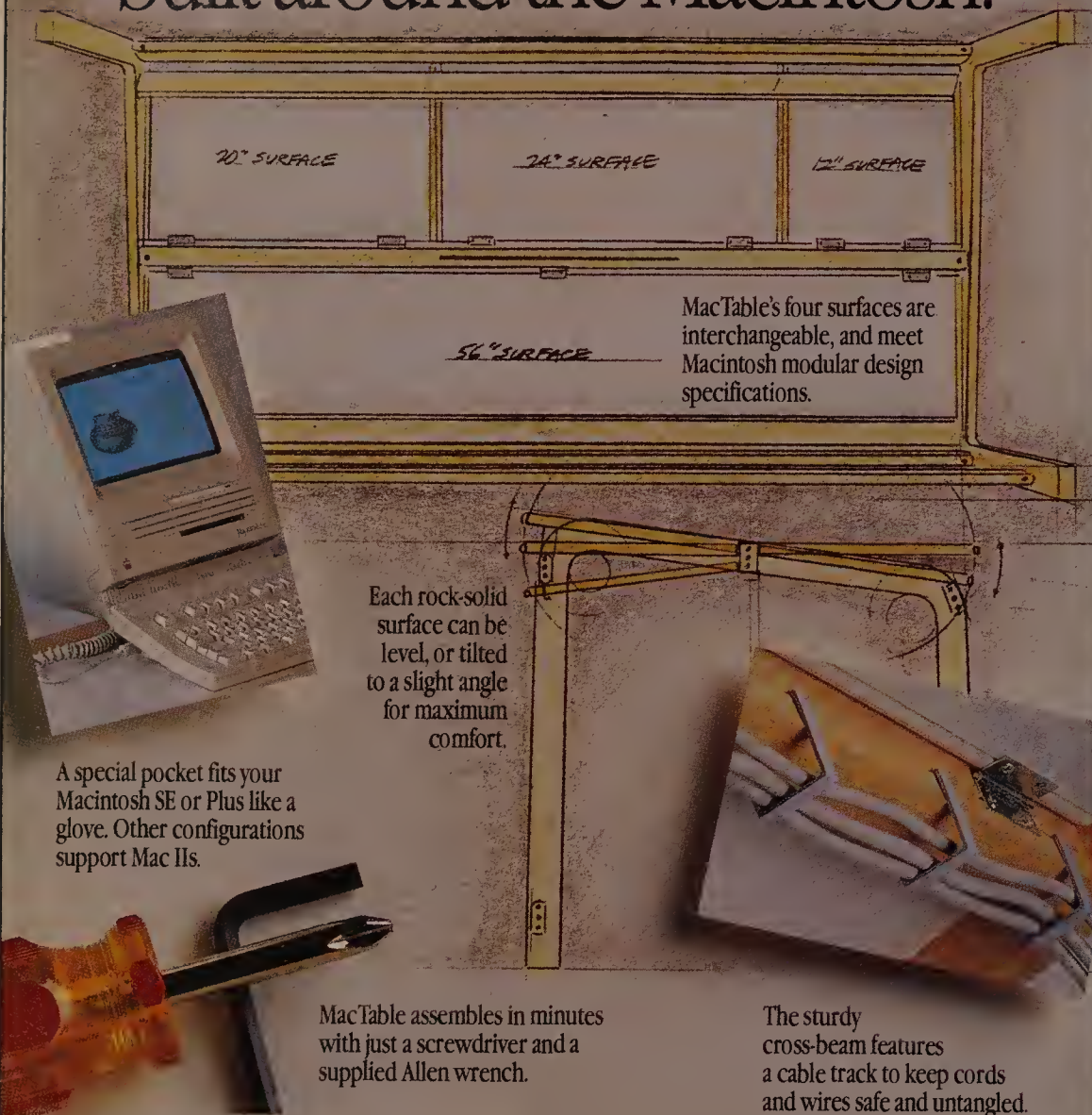
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NEW! Includes a 24-hour Virus Newsline for new information and instant updates (A SAM Exclusive)

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Eliminates false-alarms by "learning" the normal activity in your system that merely looks like a virus (A SAM Exclusive)

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## Introducing Symantec AntiVirus for Macintosh (SAM™), Version 2.0.

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SAM finds and destroys all known viruses and clones. It also protects you from new, unnamed viruses by constantly scanning for suspicious virus-like activity. And only SAM 2.0 protects you with instant virus updates from our exclusive 24-hour Virus Newsline.

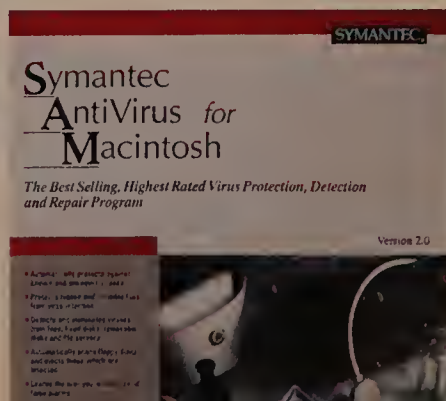
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MacUser Eddy awarded in March 1990. MacUser Five Mice rating awarded in October, 1989. SAM has been the best-selling AntiViral program since October 1989, based on Ingram MicroD, Kenfil, and Softset best-seller lists. Current SAM users call 800/626-8847 in CA or 800/441-7234 outside CA about our low cost upgrade. Symantec Virus Newsline available in North America only. SAM and Symantec are trademarks of Symantec Corporation. © 1990 Symantec Corporation

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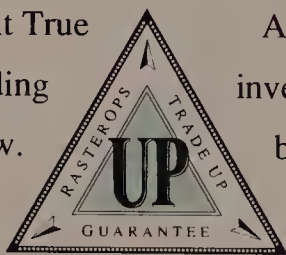
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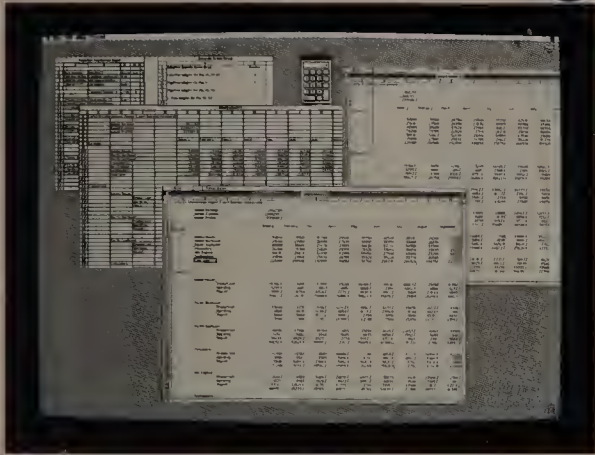
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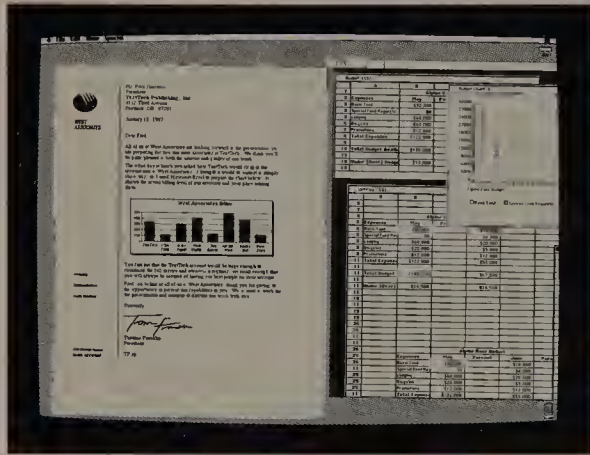
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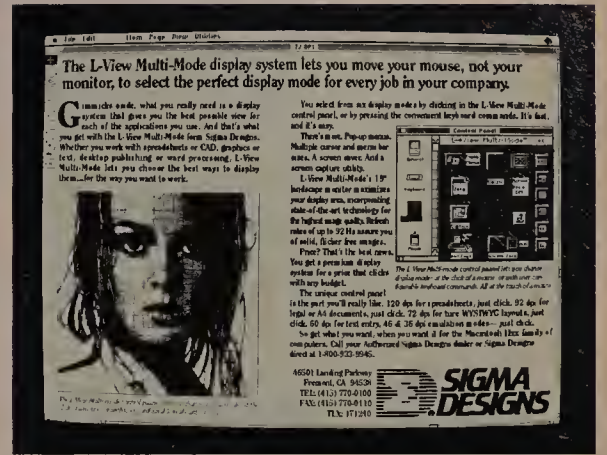
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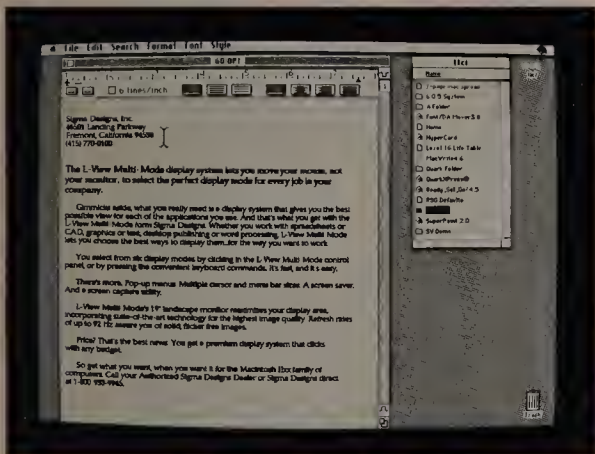
120 dpi for spreadsheets or CAD- just click.



92 dpi for legal or A4 documents- just click.



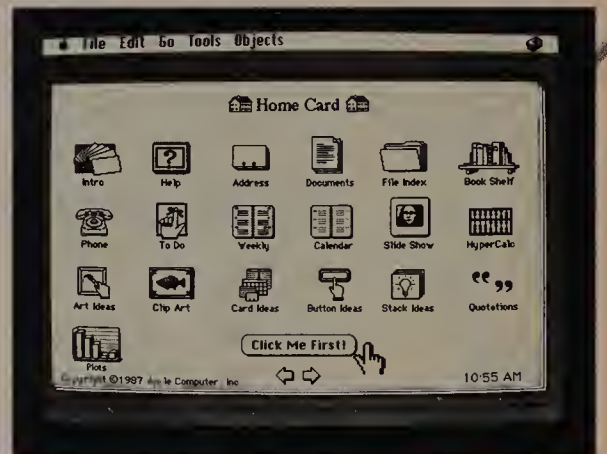
72 dpi for True WYSIWYG layouts- just click.



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Gimmicks aside, what you really need is a display system that gives you the best possible view for each of the applications you use. And that's what you get with the L-View Multi-Mode from Sigma Designs. Whether you work with spreadsheets or CAD, graphics or text, desktop publishing or word processing, L-View Multi-Mode lets you choose the best ways to display them...for the way you want to work.

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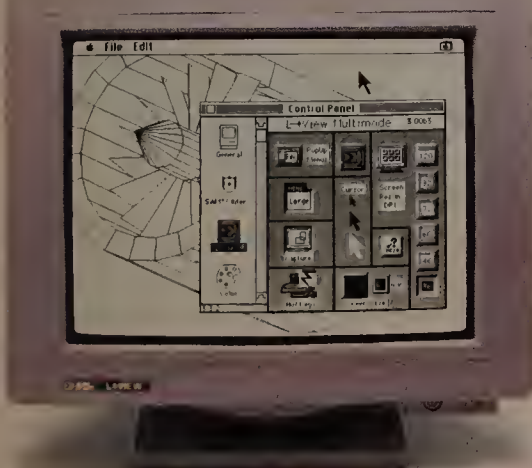
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### MICROSOFT WORD COMPATIBILITY

Don't worry about document compatibility, WriteNow 2.2 is directly compatible with MacWrite, Microsoft Word 3.0, and Microsoft Word 4.0.

### 1.4 MILLION-WORD THESAURUS

Find just the right word with the largest thesaurus ever to ship with a Macintosh word processor.

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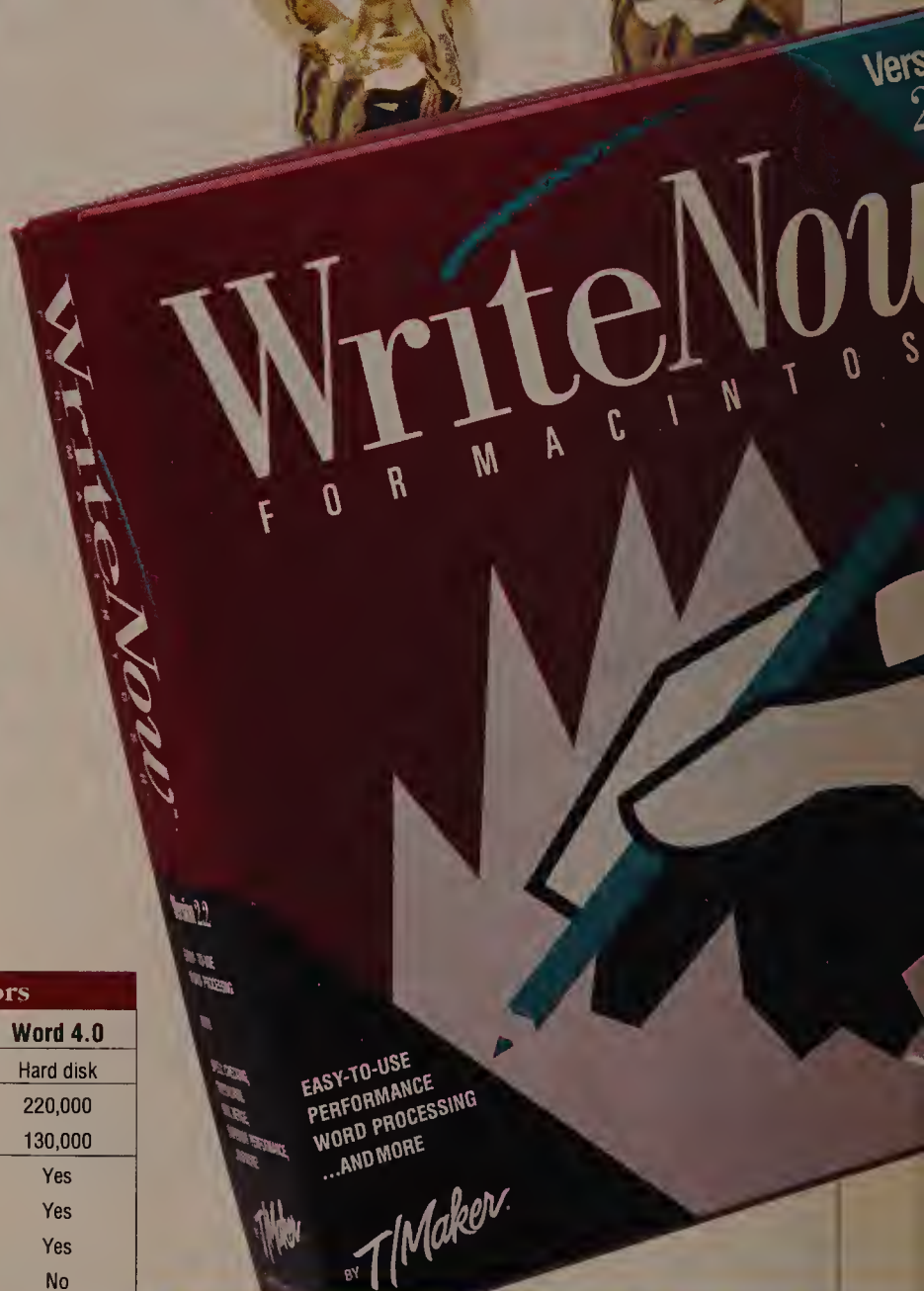
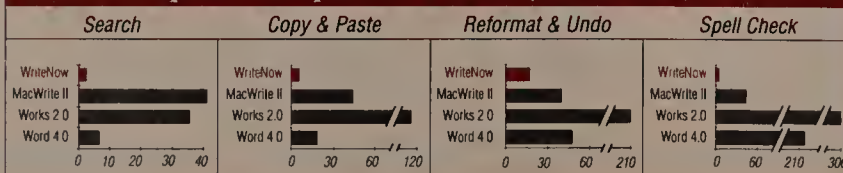
WriteNow also has the largest—and *fastest*—spelling checker of any Macintosh word processor.

WriteNow 2.2—still the word processor of choice!

### Quick Comparison of Leading Word Processors

	WriteNow 2.2	MacWrite II	Works 2.0	Word 4.0
Disk space needed:	(2) 800K	Hard disk	Hard disk	Hard disk
Thesaurus (Size in words):	1.4 million	220,000	No	220,000
Spell Checker (Size in words):	135,000	100,000	60,000	130,000
Mail Merge:	Yes	Yes	Yes	Yes
Format Accelerators:	Yes	Limited	No	Yes
Multiple Header/Footers:	Yes	No	No	Yes
Extensive Undo:	Yes	No	No	No
Retail Price:	\$199	\$249	\$295	\$395

### Speed Comparison Charts (in seconds)



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# MAC BULLETIN

## **Watching the Macs at Work**

Two utilities for tracking and controlling how Macs are used have gone through changes recently. With Quota (formerly the shareware utility DoppieMaker), a network manager can limit how many copies of an application are launched (to avoid exceeding license agreements), prevent users from making unauthorized copies of applications, and compile usage reports. Pricing depends on network size. For more information, call Proteus Technology at 403/426-6794. SoftView's MacInUse records everything a Macintosh user does, and can monitor an entire network without users knowing. Version 3.0 adds the ability to record the names of data files used and to track several applications running under MultiFinder. It lists for \$99. For more information, contact SoftView at 805/385-5000.

## **MacNIX Talks UNIX with Macs**

UniPress Software's MacNIX puts a Mac interface on access to E-mail and files on UNIX servers. Icons represent standard UNIX file types, binary files can be transferred both ways, and folder relationships are maintained in the UNIX directories. MacNIX provides print spooling and can run in its own partition under MultiFinder. MacNIX also provides terminal emulation and supports most Mac-to-UNIX server hardware, including Kinetics' FastPath and Cayman Systems' GatorBox. For more information, contact UniPress at 201/985-8000.

## **New Entry-Level Stat Package**

FloStat, a new \$99 package named in honor of Florence Nightingale for her use of statistics to promote health care a century ago, combines mapping and graphics with statistical analyses, including one-way ANOVA, t-test, correlations, simple regressions, and others. Its Maplink feature lets you link data with maps in PICT format (it comes with a collection of maps), and it generates a variety of standard tables and graphs. For more information, contact Population and Society Research Center Software at Bowling Green University, 419/372-8648.

## **Touch Talks**

Touch Communications and Infonet have announced products for accessing the emerging worldwide E-mail system based on the X.400 standard. Touch's Worldtalk, which requires a UNIX server somewhere on an organization's wide area network, is a collec-

tion of gateways connecting QuickMail, Microsoft Mail, and InBox Plus on the Mac; cc:Mail and Action Technologies' MHS under DOS; and SMTP and UUCP in the UNIX world. Infonet is developing a gateway to link Worldtalk with Infonet's Notice 400, an E-mail, fax, and telex system available in most countries. Infonet is also developing gateways from Notice 400 to MCI Mail and Atlas 400. For more information, contact Touch Communications at 408/374-2500 and Infonet at 213/335-2600.

## **Capture Upgrade Planned**

Mainstay Software's screen-dump utility Capture is being upgraded to version 3.0. Users can set it to automatically scale a captured image by setting a percentage in the Capture Control Panel window, with a new option that can capture the cursor. The new version is being written for compatibility with Apple's future hardware and system software. Capture lists for \$79.95. For more information, contact Mainstay at 818/991-6540.

## **Fresh-Squeezed Images**

Kodak is shipping Colorsqueeze, an application that compresses hard-disk-hogging 24-bit color images. Colorsqueeze's compression algorithm deletes redundant pixels and frequencies invisible to the eye, reducing 24-bit PICT and TIFF files to anywhere from  $\frac{1}{5}$  to  $\frac{1}{40}$  of their normal size with almost no visible degradation of image quality, according to Kodak. It takes about 40 seconds to compress a 768K file on a Mac IIcx, and a thumbnail representation of the original file accompanies each compressed file. Colorsqueeze lists for \$179. For more information, contact Kodak at 716/726-3437.

## **What's nu in Motion Control?**

The Virtual Instrument Library for Motion Control from nuLogic is a set of programs for monitoring and controlling motion of test equipment, materials handlers, robots, and similar devices in three dimensions. The \$195 Library consists of more than 120 virtual instruments (software-only data-acquisition and control devices). The Library requires National Instruments' LabView 2 instrumentation program and nuLogic's \$1795 nuControl Board, a three-axis, servomotor controller board that operates devices. The nuControl Board is designed for Mac II-series machines and works with other appli-

*(continues)*





cations besides LabView. For more information, contact nuLogic at 617/444-7680.

### **VIDI's 3-D Plans**

Visual Information Development (VIDI) is developing its next generation of three-dimensional design tools. 3DModeler, a \$595 upgrade to Dimensions Design, will add polar and linear duplication; extrusion along any angle or spline; click-and-drag handles on shapes; bezier splines; hierarchical grouping; seven 3-D primitives; and *loafing*, a function that creates curved-surface models from 2-D objects. VIDI is also working on a Dimensions Presenter upgrade called 3DProducer, and a \$95 set of surface textures for rendering in 3DProducer called Dimensions Materials. 3DProducer will list for \$595 and add a spreadsheetlike interface for controlling objects, light sources, and cameras frame by frame. For more information, contact VIDI at 818/918-8834.

### **Service Bureau Group to Form**

The National Association of Desktop Publishing Professionals is planning to hold its first meeting in the Sheraton Towers' Commonwealth Room on Friday evening, August 10, from 7 p.m. to 10 p.m., during the Macworld Expo in Boston. The organizers hope the association will give the country's estimated 800 to 1000 service bureaus some clout with desktop publishing software companies and high-end hardware companies. They plan to address such issues as the industry-standard 90-day warranty on image-setters and the lack of diagnostic tools for image-setter owners. For more information, call Van Tanner at 919/855-0400 or Bill Crider at 602/798-3200.

### **Cloud Over the 68030 Clearing Up**

In late June a federal judge granted a temporary stay that allows Motorola to continue selling the 68030 microprocessor, which is the central processor for the Macintosh SE/30, IIfx, IICx, IICi, and IIfx. Previously, another federal judge had ordered Motorola, based in Schaumburg, Illinois, to stop selling the 68030 because it infringed on patents held by Japan's Hitachi. A spokesman for Motorola said the two companies had asked for the stay jointly as part of a "framework of an agreement," between Motorola and Hitachi. The spokesman would not comment on the terms of the pending agreement.

### **Apple Talks It Up**

In a move likely to promote AppleTalk as a computer-industry standard, in June Apple Computer announced plans to license the source code to developers. The licensing will allow non-Mac vendors to take advantage of AppleTalk as an existing low-end networking standard. The fee for the object code is \$10,000; for the source code, \$40,000; for the source code with the right to sublicense, \$40,000, plus \$20,000 for each sublicensing. Apple will charge a \$500 annual maintenance fee for upgrades. For

more information, contact Apple Software Licensing at 408/974-4667.

### **HP Cuts DeskWriter Price**

Hewlett-Packard announced in July that it cut the price of its HP DeskWriter ink-jet printer by \$200 to a list price of \$995. The DeskWriter, which started shipping in July 1989, is a 300-dpi resolution, QuickDraw-compatible printer. For more information, contact Hewlett-Packard at 800/752-0900.


### **Apple Comings and Goings**

Apple Computer announced in late June the appointment of Robert Puette as president of Apple's USA division, and the departure of Donald P. Casey, vice president of networking and engineering. Puette, who started his presidency in July, was general manager of Hewlett-Packard's PC Group from 1981 to 1990. Casey, who had been with Apple since 1984, left to become vice president of Lotus Development Corporation's new spreadsheet division.

### **Claris: To Apple Forever**

Apple has apparently decided to keep a tight grip on software development for the Macintosh. In 1987 mounting pressure from other software vendors convinced the hardware company to stop selling Apple-labeled software and to create Claris as a subsidiary with an eye to spinning it off as a separate company. Apple now plans to keep Claris, which is believed to be the second largest Mac software vendor after Microsoft. (As a subsidiary of Apple, Claris does not release its own sales figures.) Apple CEO John Sculley said Claris will continue to develop applications and will begin to develop "extensions" to Apple system software and tools for multiplatform connectivity. Claris may license the latter to third-party developers. Bill Campbell, who was with Apple before Claris was formed, will continue as Claris CEO.

### **Lotus Wins Interface Suit**

Lotus Development has won its look-and-feel copyright infringement suit against Paperback Software International. In the late June decision, U.S. District Court Judge Robert E. Keeton stated that copyright protection applies to the graphics, menus, and commands of a software product, not just to actual program code. Wrote Keeton: "The user interface of 1-2-3 is its most unique element, and is the aspect that has made 1-2-3 so popular. That defendants went to such trouble to copy that element is a testament to its substantiality." Lotus's victory is likely to have a major impact on Apple's pending suit against Microsoft for alleged infringement of the Mac interface by Microsoft Windows. The week after the judgment, Lotus initiated similar lawsuits against Borland, which markets the DOS spreadsheet Quattro, and the Santa Cruz Operation, which markets the UNIX spreadsheet SCO Professional. 



# The Macintosh® Gives You The Power To Be Your Best...



## MegaMac™ Makes It Affordable.

**T**hese days it seems like Apple is introducing computers quicker than you can say 'M-a-c-i-n-t-o-s-h.' Trouble is, most of the new Mac models sport some pretty lofty price tags. And that, of course, only puts 'the power to be your best' further out of reach of most Mac enthusiasts. At least until now...

### Introducing the MegaMac™ Solution.

Here's good news for aspiring Macintosh power users everywhere. Connect a NewCo Technology 50MHz MegaMac™ to your existing Mac SE/SE 30 or any Mac II and you may never again have to bow your head in reverence to a faster and more expensive Mac.

The combination of your Macintosh and the NewCo MegaMac can outperform the fastest Mac available including the new IIfx. That's astonishing considering the MegaMac costs a lot *less* than a IIfx. Plus, with a MegaMac, you can upgrade your system anytime you need extra performance...without ever having to scrap a single piece of Mac hardware. You'll never again have to worry that the Macintosh you just plunked down big bucks for is no longer 'top drawer'.

### Apple Should Have Invented This.

If you're thinking the MegaMac is just another 'accelerator' board, think again. The MegaMac is a totally self-contained *CPU Performance Extender* — with its own memory, microprocessor and power supply. There's even an internal, 'fx' style Processor Direct/NuBus expansion slot and dual compartments for installation of up to 400 megabytes of high performance disk storage.

Unlike some old-fashioned accelerator boards that require tricky Macintosh circuit modifications, the MegaMac connects to your Mac via a snap-in NuBus accessory card. There's no soldering, no voiding your Apple warranty and no complicated software to install. Just plug it in, switch on your system and enter a whole new world of 'power' computing.

### Premium Performance, Not Price.

The secret to MegaMac's astonishing performance is its proprietary design. A 50MHz 68030 microprocessor combined with 64K of 12 nanosecond write-through™ cache memory and up to 64 megabytes of high speed dynamic RAM provides blistering fast program execution. The result? Productivity gains greater than you ever imagined...all for much *less* than the price of a Mac IIfx!

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Should your MegaMac ever require service, just return it to the factory for a no-charge repair for up to three years from date of purchase. NewCo can afford to back the MegaMac this well because it's been making microcomputer products longer than Apple — nearly 18 years now!

The next time you feel humbled by the price tag on one of Apple's shiny new Macs, call us at **1-800-662-9005** to arrange a MegaMac 31-day money-back evaluation. Or, if you prefer, send us a sample diskette of some of your toughest, most time consuming computing tasks. We'll show you how the MegaMac™ can make 'being your best' a whole lot better...not to mention a lot less expensive.



NewCo Technology, Inc.



**The Mac IIcx & the NewCo MegaMac.**

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YOU'LL THINK TWICE  
ABOUT REMOVABLE  
MASS STORAGE.**



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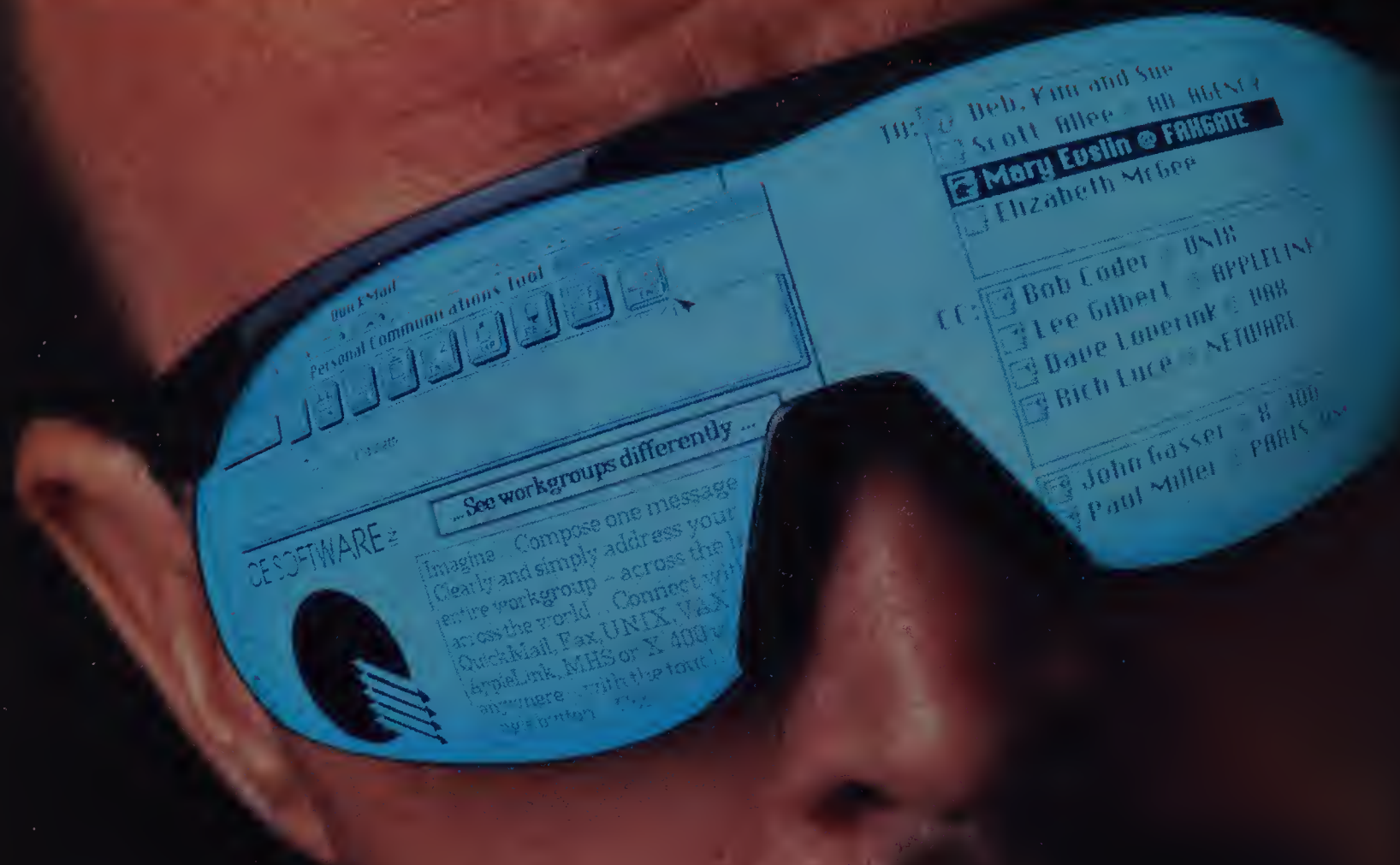
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Get the message?”

### “Go to a dealer and try it.”

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# What It's Like to Buy a Mac Product

WHY SO MANY PEOPLE SWITCH TO MAIL ORDER

BY JERRY BORRELL

**I**n the spring a young man's thoughts turn to . . . software. That probably says something more about me (not so young) than it does about amour. For months now, I have been looking for an opportunity to visit computer stores and see

what is happening there. Too frequently press types forget what it's like for the average person who has to buy computer products. I wanted to remember.

So on one of San Francisco's all-too-infrequent bright mornings I set out to explore the world of Macintosh as seen through the eyes of people who visit computer stores. I started off for the dealer nearest my home, the Egghead Discount Software store on Lombard Street. That's the street that leads to the Golden Gate Bridge. I've always thought of that end of town, near the bridge, as the end of the earth, or at least where you begin the journey to the state of mind known as Marin County. I wasn't expecting much as I pulled out of the traffic rushing to the bridge and parked next to the store. I pulled on the store door and . . . it was locked. *Good grief, they don't open till 10 a.m.,* I thought. *What in the devil am I going to do till they open?*

I avoided the magazine store nearby, where I knew I could lose the entire morning, and instead bought some coffee and walked for a while.



Tom Santos's Macadam is a store for real people.

By the time I returned two others were waiting. Together we paced. *An auspicious start,* I thought, *people waiting at the door for the store to open.* One store window contained huge posters for Windows 3.0 and some Microsoft cartons. Another was empty, forlorn looking (waiting for Windows applications, I guess).

By the time the store actually opened there were four of us waiting to get in and do something involving computers. *Franchise,* I thought as soon as I was inside. Everything had a place. Every square inch was planned.

It was like a video-rental chain—my expectations went down a notch further. Egghead stores, apparently, are divided into accessory areas at the front of the store, IBM software in the second third, and Apple/Mac in the back. Under a card labeled Apple/Bus-

iness was education software for the Apple II. Under a Mac business label was Mac music software. Never mind, I had found my section. Software at Egghead is organized by subject area. It's not indicated by any label, but there is a logic to it. Microsoft and Claris labels dominated the shelves, but there were other products to be found. In word processing Microsoft Word, MacWrite II,

and WordPerfect were visible. WriteNow and Nisus were missing.

As I perused the shelves, two other customers found their way to the Mac shelves as well—and immediately picked up Coda Music Software's Finale. Chatting away in a Scandinavian language, the couple turned the box over several times. Then a young man arrived, a store employee. "Is this version 2.0?" they inquired. The staffer responded politely that it could be determined by opening the package and looking at Get Info under the File *(continues)*

ROBERT HOLMGREN



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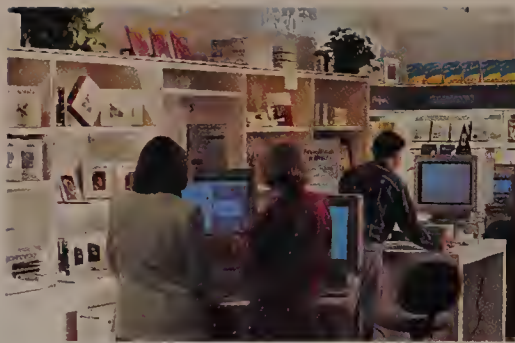
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menu, which he did. At this point I edged closer to the conversation. "Version 1.2," said the male half of the couple. "Do you know where we can find 2.0?" And to my surprise, the Egghead staffer responded, "There's a music software store down on Mission; they'll probably have it. I'll call down there and check for you."

That pretty much won me over—this guy was passing over a sale of a few hundred dollars. Another customer found his way to the Mac software. "Hey. Do you have a spell-checker for the Mac?" he asked. A quiz followed, the salesman inquiring what word processor he used (MacWrite 4.0) and what he needed to do. "Thunder will do it. It's a DA that will run with MacWrite."

That told me a lot. The salesman didn't give a pitch for MacWrite II, which has a powerful spelling checker. He focused on solving the customer's problem. I was still impressed. The phone rang—it was someone wanting to know how to print a page on a 3 by 5 card from a Mac DTP program. That stumped the salesman, who asked the manager, and they both got on the phone to suggest a solution.

At that point I had to ask myself why they bothered to stock IBM products at all since they were only doing business on the Mac. The answer of course is that Egghead is a franchise. They have stores all over and lots of PC users, so there would be periods when all the customers wanted PC software. I was surprised to see that PageMaker was not being shown, so I asked. "Oh, they announced 4.0 so we pulled all of the 3.0 off the shelf and sent it back to them," the salesman said. "We'll get 4.0 in a few weeks."

This kind of approach is not what I had anticipated. I expected a kind of Gothic horror story in which people walked into stores, were abused, given

bad advice, and sent out in a state of confusion—my own experience in the past. The day was still young, but I left the store hopeful. Polite, knowledgeable, helpful staff selling lots of current Mac products.

### A Factory Tour

I set off for downtown San Francisco. In the heart of the city's financial district, opposite the Pacific Stock Exchange. Tall buildings. No parking. Cold wind blowing down concrete and glass canyons. Across from the exchange is a Computer Factory store. Inside was a cavernous space broken up occasionally by a desk where busy people sat on the phone, typing, talking to one another. No customers at all—but there was obviously business being done. In the back was a wall of shelves covered with software. On closer investigation the wall looked like a Soviet department store—lots of the same products in different places. Maybe 15 different software packages perched on the shelves. Microsoft and Claris dominated the space. And Ashton-Tate's FullWrite, with a prominent yellow tag announcing the special price of \$395.

That reminded me of a computer store in Cupertino, on De Anza Boulevard, in view of the Apple skyscrapers (tall buildings are a relative thing in Cupertino), that seems to take pride in stocking products from defunct developers. I'm always furious at the thought of people buying a product for which there will be no technical or customer support.

I walked around the Computer Factory's kiosklike area that housed Mac products. An SE, a Radius monitor, Apple scanner, HP printer, Apple CD player, and a Mac IIfx (not turned on). Also some promotional materials for Microsoft. No one asked if I needed help. No one seemed to notice me. Cartons of computer products on hand trucks were shuttled by. It was nice to be able to browse around, but it wasn't the same feeling as walking around in a bookstore where you enjoy being left alone—rather, I felt ignored. I could tell that things were happening in the store. I could see an area where training takes place. I imagine the store provides wonderful sup-

(continues)

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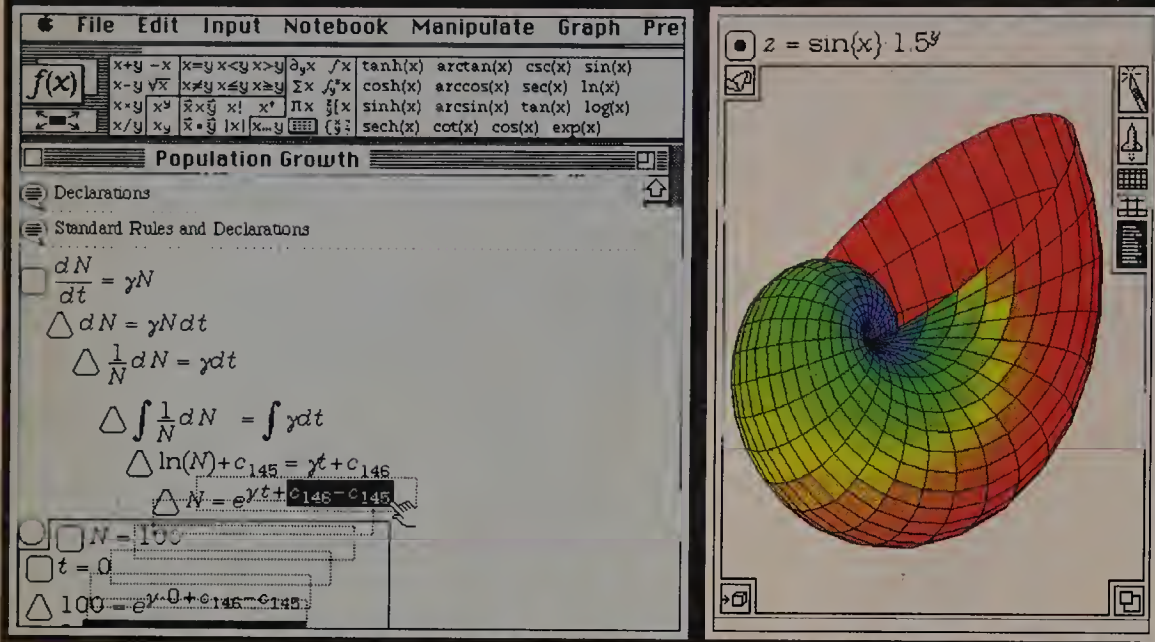
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port for customers in large companies, but it felt as if their business was business, not computers.

## Egghead Redux

Then I went to another Egghead store—one I had always wanted to visit because of a celebration lunch I'd had with Victor Alhadeff, one of the founders of the chain, the day it opened. The store was really jammed with accessories up front. Lots of suits on customers. This store was different from the first. It had computers for sale as well. Back in the Mac section, two women stood conversing over a PC clone of some sort. The saleswoman was explaining to the customer that because IBM computers were cheaper you could get more computer power for your money. And the interface that made the Mac so useful was now available on the PC. I peeked over her shoulder at the Windows screen—at the muddy icons and folders. The saleswoman went on to tell the customer about all five of the applications available under Windows 3.0 and to say that more would be available in September. The customer asked something again about a Mac and received another answer about the PC. Nearby sat a Mac II, not even turned on.

In another aisle a man in a business suit was asking about OCR software for the Mac. The salesman's reply was "Do you have access to a PC?" "No, I want to read documents for my Mac." "Well, we have this scanner," the salesman pulled out one of the new hand-held scanners, "but it's really for pictures." "Do you mean that there is no software that allows me to do OCR on the Mac?" I gently interrupted and offered the names of several Mac products that allowed for OCR input and suggested that a flatbed scanner would be needed, then disengaged myself from the conversation.

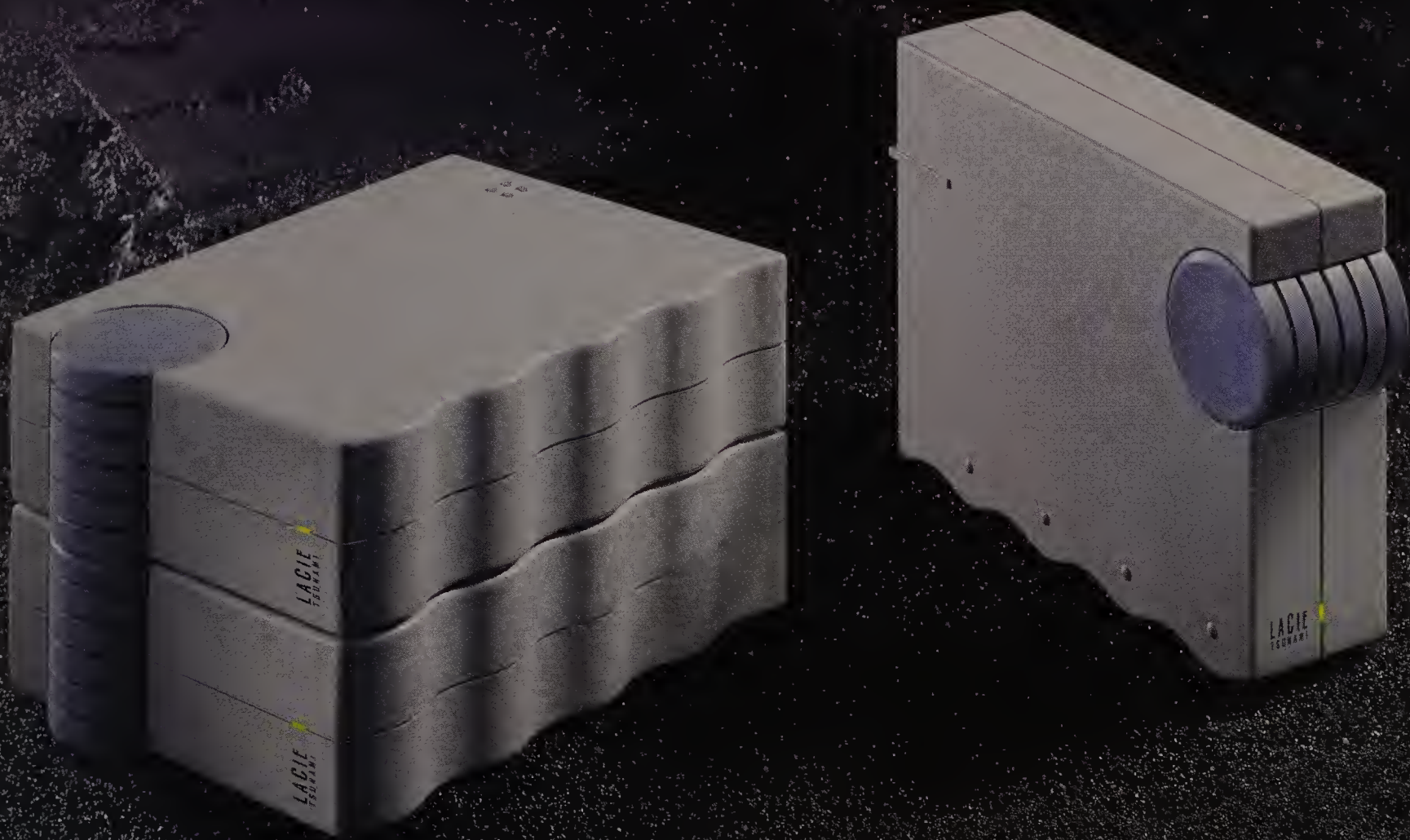
## More Visits

Next door to this Egghead is a Tek Computer store. Dark, a little gloomy. There were PC clones on tables. A few printers. And Macintosh boxes. Old MacPaint boxes were on the shelves. Real old. Boxes that proclaimed that the product could be used on a Plus, a Mac XL, and a 512K Mac. And Mac-  
(continues)

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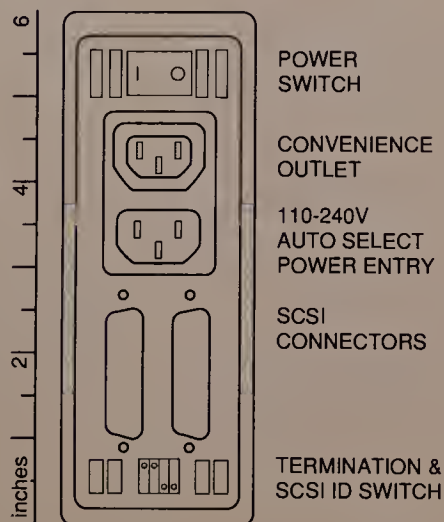
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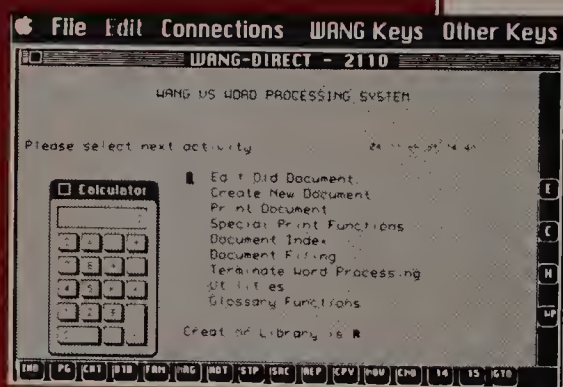
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Paint in Claris boxes as well. Version 3.0 of PageMaker with its label proclaiming NEW. A hodgepodge of Apple II, PC, and Mac software. I overheard training going on upstairs and questions being asked that made me want to go up and offer answers. I left in a hurry. The day was getting old.

Elsewhere in town I found the Computer Selection Business Center, an Apple authorized dealer. I asked if they sold PCs and was told that the store sold only Macs. The software selection was better than that of the Computer Factory, but still a little sparse. They had Datacopy's OCR software, which would have helped the fellow at Egghead. Business Class from Mediagenic was still on the shelf, even though it was withdrawn from the market last year. There was no PageMaker on the shelf—I hoped this was a sign that they, too, were awaiting the new version.

The store had kiosks divided up into work areas: networking, engineering, page makeup, business. Most of the work areas were empty, with no equipment available to match the labels. The two salesmen were bantering and, after trying to help me, went off to a kiosk to play MacGolf. I took that as a good sign. There was a training room for DTP, and a product demonstration was in progress. I and the trainee were the only customers during my visit. I had the feeling that I could find help here, but that resources beyond major products and CPUs were limited.

Next I was off to ComputerCraft, the chain store where in 1984 I had surrendered a check for \$4000, all of my savings, to buy a PC so that I could finish a novel. I made one of the largest purchases of my life in 20 minutes. The store salespeople there were quick, fast, efficient. This ComputerCraft was big-time. Really business oriented. Three little island-kiosks displayed the different families of computers that were sold—NEC and other clones, Compaq, Next, and Apple. They had an SE/30 with an 80MB hard disk for \$4749, a IIfx with 4MB of RAM and one floppy drive for \$8969. A IIfx with 4MB of RAM and a 160MB hard disk went for \$10,969. Basically, the store had Claris and Mi-

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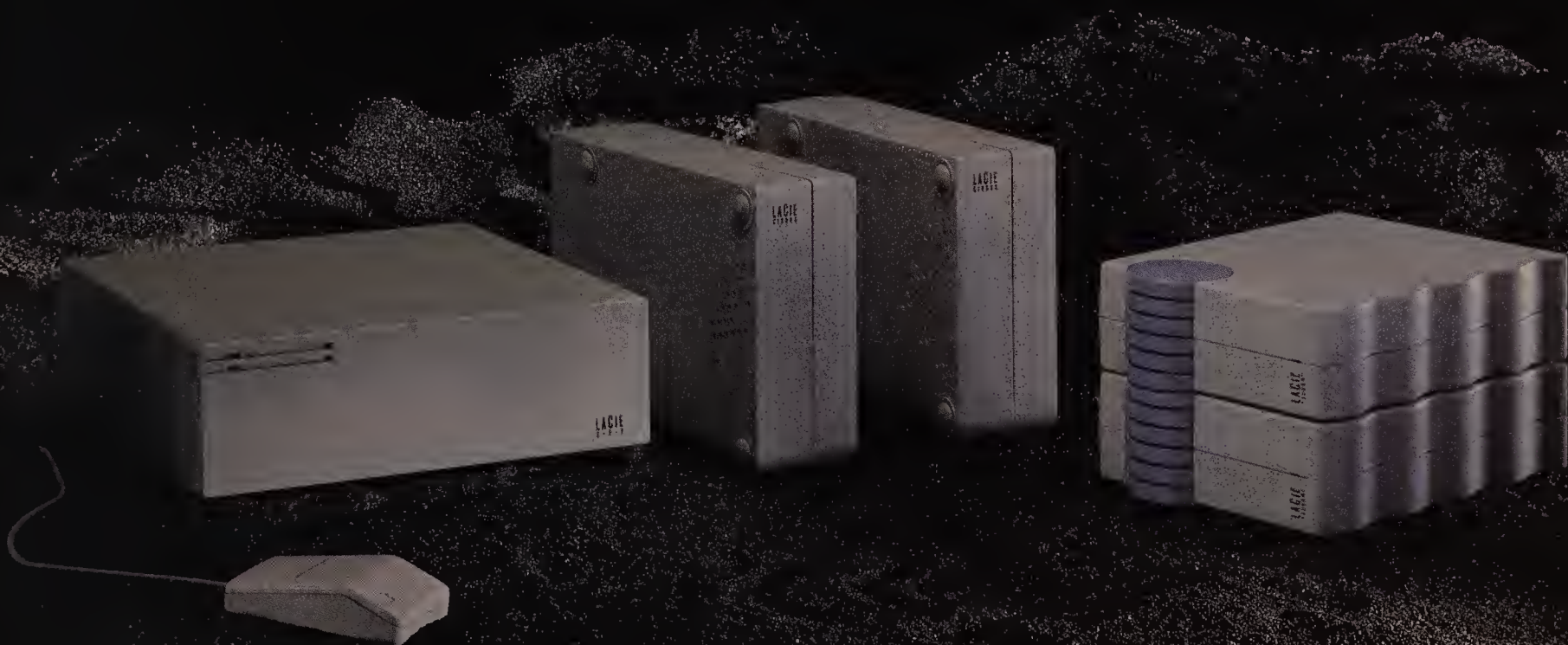


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	105	15	899	959	1199	5
	120	15	999	1059	1299	5
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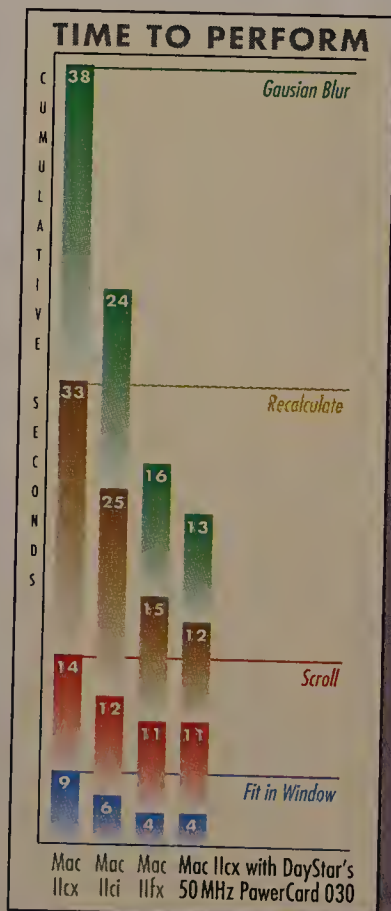
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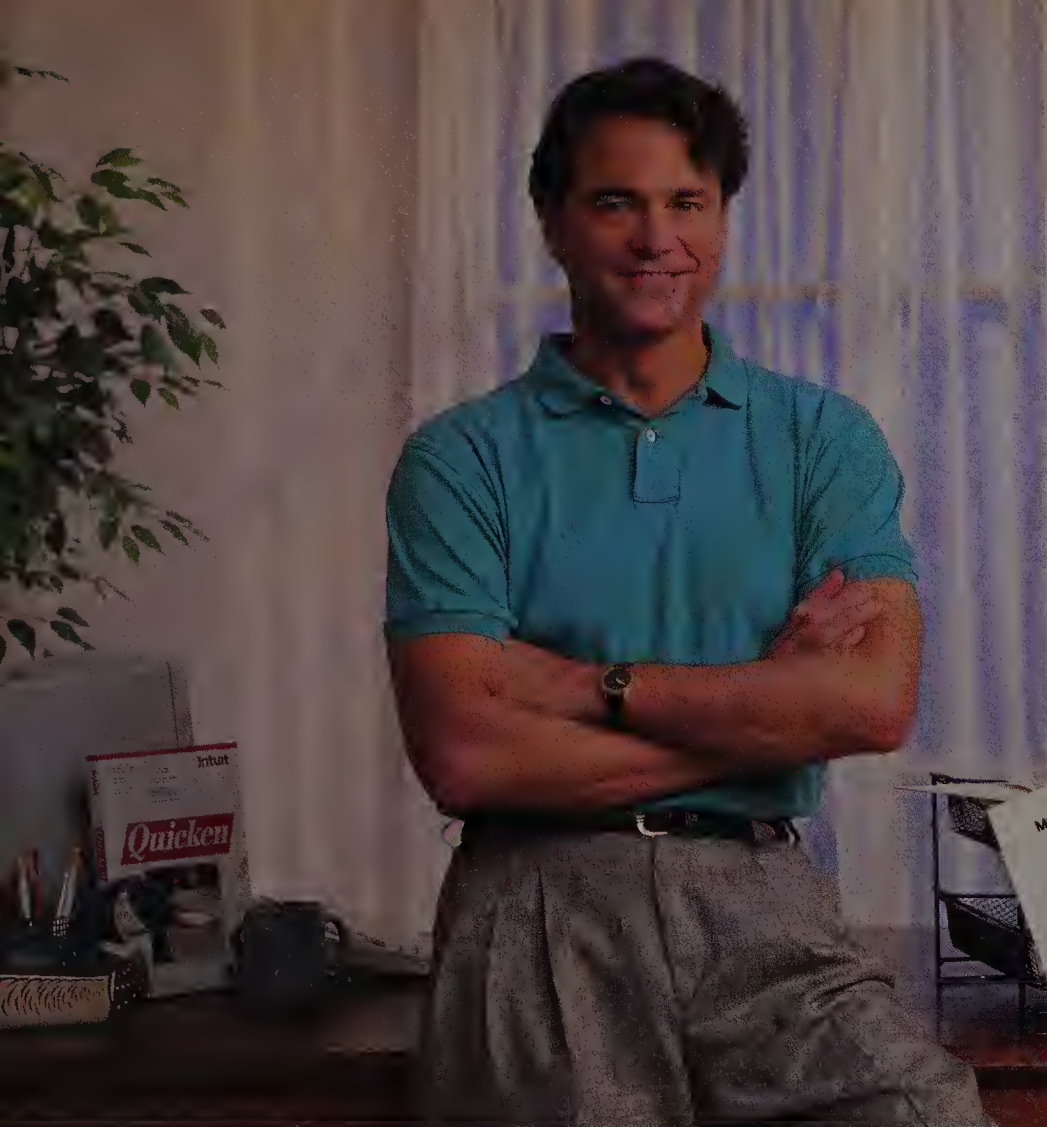
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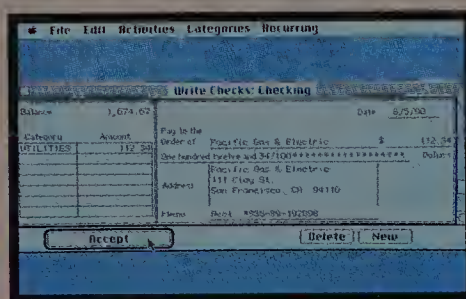
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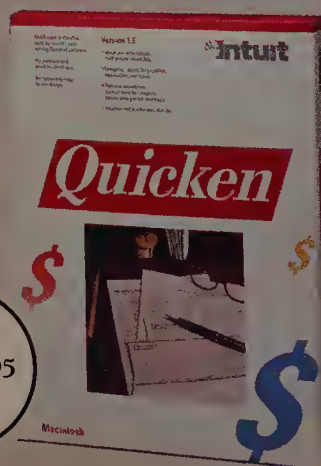
Getting started is no problem. There is no set-up involved. No chart of accounts to create. No stacks of old records to enter. I was recording checks in 3 minutes. That simple. Someday I just might read the rest of the manual to see what else Quicken can do.



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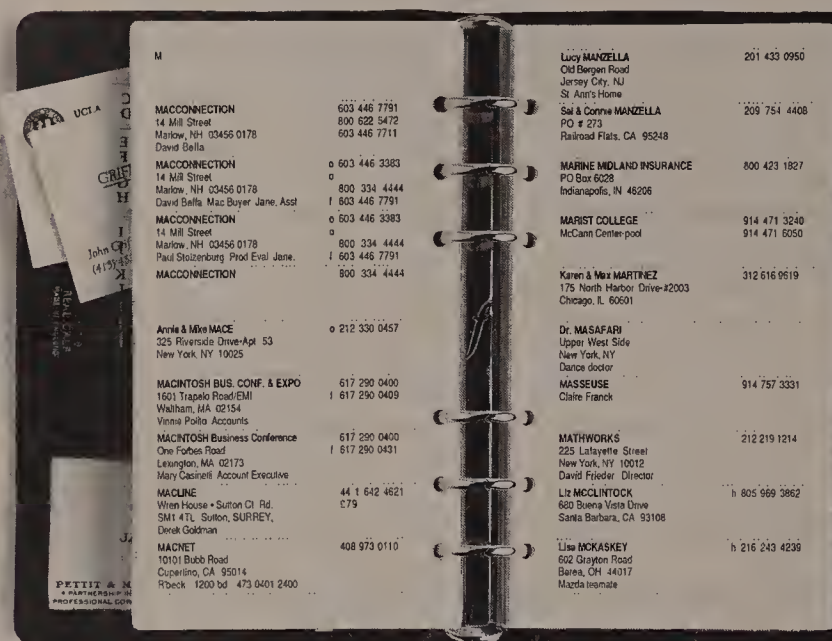
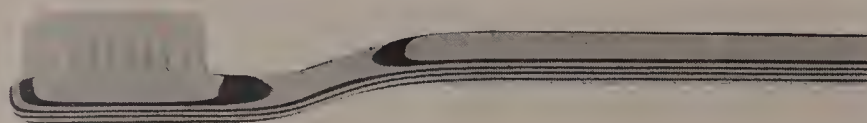
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crosoft software. Little else. On a wall was a schedule of training: classes every day in Excel, Microsoft Word, FileMaker, and PageMaker. Several people asked me if I wanted help. I thought of Steve Martin's line in *The Man with Two Brains*, "So clean, so fast, so professional."

### What's a Body to Do?

The answer, if you are not in a corporation where there's a combination of attention from the chain-store representatives and in-house technical support staff, is to find a store or a dealer that will be there when you need help.

We now have in San Francisco an outpost of the ComputerWare company. A little-promoted collection of stores that sprung from the first ComputerWare on California Street in Palo Alto, California. The Palo Alto store was a place of legend, where on a Saturday morning people like Jean-Louis Gassée would walk in carrying a cappuccino from the coffee shop next door, wanting to talk about the latest new product on the shelf. It was also the only place in the country back in 1985 that sold only Macintosh software. The salespeople were all Mac freaks and could explain why you were likely to be experiencing problems with some product.

ComputerWare has since become a chain of five stores. They still sell only Macintosh software—and they're still the most knowledgeable commercial outlet for Mac software in this area. Software is divided into labeled categories. PageMaker 4.0 was on the shelf, as was Finale 2.0. WriteNow 2.2 was there at a price of \$135. Adobe Photoshop sold for \$595, slightly over Egghead's \$575 price but still under Adobe's list price of \$895. They have lots of hardware but because Apple won't authorize the chain as a dealer they can't sell Macs. (You figure it out. Better yet, visit an authorized store and ask questions about software.) All of the Adobe PostScript Type Library lined one set of shelves. There were scanners, printers, CD ROM drives, hard disk drives. After five years it's not the Saturday morning place for a coffee, but if I were buying software that's where I would go.

The last store of the day was an  
(continues)

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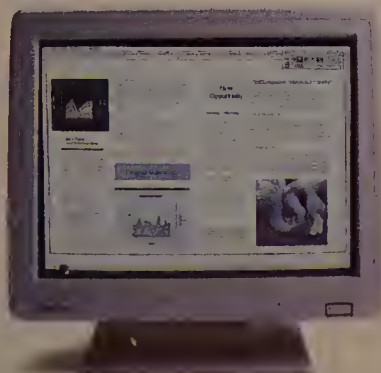
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upstart in the South of Market area of San Francisco called Macadam. There, in one of the old brick warehouses that line the sides of the street, is the computer-dealer equivalent of the old concept of cafe-bookstore. The kind of place where you could go and order some coffee, maybe even a sandwich, and sit and read the books. The kind of place where steaming coffee in a thick white mug and rich color plates in travel books beckon you to sit and spend the morning thinking about where you might like to go for your next vacation. The kind of place where the proprietor knows the title and location of a book that a person like you or I would probably want to read.

Tom Santos, four colleagues, and his two dogs preside over just such an emporium, stocked with the Macintoshes that he has collected over the last six years. Little alcoves are set up with equipment and software. Each alcove features some different subject area: music, DTP, engineering. Real people come into the store and sit and work at computers that they cannot afford to buy. There is a lot of current software on the shelves in the center of the store. Copies of back issues of Macintosh magazines line the walls. I carried a soft drink into the store and wandered around while waiting for Tom. The huge wooden rafters of the high ceiling and the industrial carpet give the place a quiet, slightly worn feeling. Printers from various manufacturers hum away in odd corners. Designer cases for Macs and hard drives sit on shelves. It's the sort of place people come into on weekends to argue the merits of the latest version of popular software.

### So?

The truth of the matter is that there are many good stores out there, but few people know how to find them, or have the time, or are patient enough to wade through all the bad stores to find a good one.

And so mail-order purchase, at least for software, thrives. Just as it did in the PC marketplace. And most people will never have the joy of sitting down with a coffee and Tom Santos as he waxes technical over the latest version of some product. **M**



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Sony mechanism	yes	yes
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FCC certified design	yes	yes
Apple-standard footprint	yes	yes
ABS plastic case	yes	yes
Apple-standard platinum color	yes	yes
2-color read/write indicator	no	yes
Full daisy-chain compatibility	yes	yes
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800K capacity	yes	yes
1.44 MEG SuperDrive capacity	yes	yes
One year warranty	yes	yes
Worldwide dealer sales & support (over 2,000)	yes	yes
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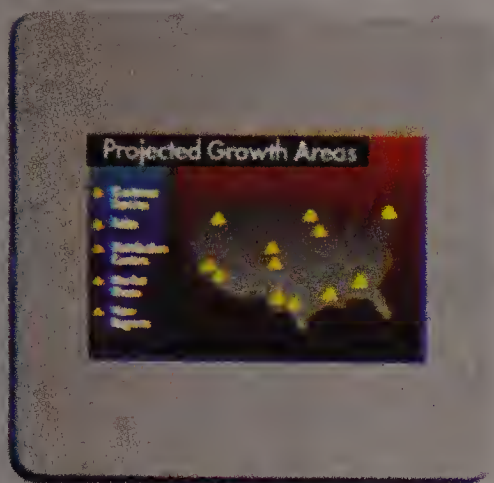
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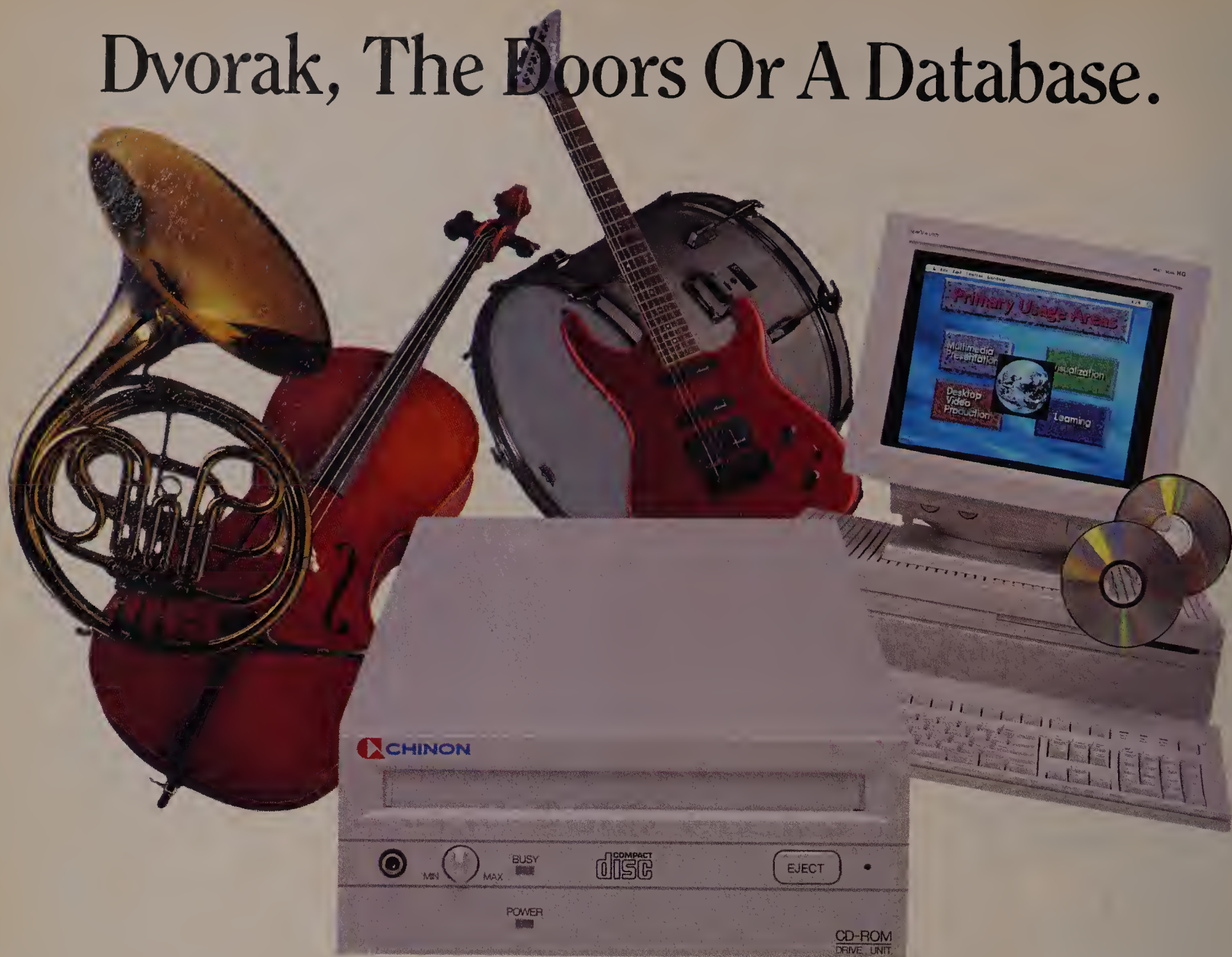
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# LETTERS

## The End of Literacy

I agree completely with your fears of where multimedia will take us [*The Iconoclast*, June 1990].

It appears that the end of literacy is indeed upon us. I had some hope that video-text communication would force a higher level of literacy, since people will be communicating by written word to a greater extent. However, this basic literacy is not the same as that required to appreciate good literature.

It reminds me of the statement in Victor Hugo's *Notre Dame de Paris* that books will kill architecture. In the Dark Ages, frescoes and murals in cathedrals were used to communicate about life. The invention of the printing press spelled doom for architecture as it was known.

Well, multimedia will most likely destroy literature and our ability to appreciate it. I had previously regarded personal computers as entirely beneficial. Thank you for exposing this dark side.

Kevin Garrett  
via America Online

## The Value of Visual Media

As a longtime reader of *Macworld* and your columns, I'm amazed and challenged by Steven Levy's column on multimedia. While your column raised many legitimate and troubling issues, it also unfairly slighted a promising new commu-

nication medium.

Yes, I readily admit that most of what will result from multimedia technology will be junk. But if I, as a developer of interactive video and educational programs, must accept responsibility for MTV's Robert Pittman, then will you (as print's champion) accept responsibility for Rupert Murdoch, the *National Enquirer*, and *People* magazine? Why should I have to answer for all the meaningless uses of multimedia technology, any more than you should have to answer for all the trivial and mind-numbing uses of print?

I agree entirely that Apple's helocar campaign portrayed multimedia technology at its worst. But if multimedia gives powerful tools to bozos like the two

guys in the helocar commercial, the same tools give educators powerful new ways to present real information, including complex audiovisual information like the medical diagnostic images my multimedia work deals with. Perhaps you've been talking to too many marketing people and just haven't seen enough real folks applying multimedia to real, nontrivial problems.

I detect in your thesis a strong antivisual prejudice, one that I see all too frequently since I became an artist. Computer and multimedia technology may yet help to redress a serious imbalance in our communication media in favor of text alone. Look at Edward Tufte's book *Envisioning Information* (Graphics Press, Cheshire, Connecti-

cut, 1990) for an eloquent explanation of the power of visual communications.

You must expect our first steps into multimedia to be halting and uncertain. It is also true that most of the attention will be on the dog-and-pony shows put on by Marc Canter and his ilk in order to sell more copies of MacroMind Director. We don't expect to see great literature from the authors of Microsoft Word; why set up Canter as the last word on the direction of multimedia?

Patrick J. Lynch  
Yale University  
New Haven, Connecticut  
(continues)

## Corrections

The retail price for the gray-scale version of *Drawing-Card Display Systems* (New Products, July 1990) is \$3195, the 8-bit color version is \$6395, and the 24-bit color version is \$8595.

Intusoft's *IsSpice* for Macintosh (New Products, June 1990) is by Intusoft, not Intuit.

The NoRad radiation/glare shield can be grounded to the anchoring screw of a Mac's D-connector whether or not the port is in use (Letters, June 1990).

The *Playroom*, educational software for preschoolers by Broderbund Software, retails for \$49.95 (Reviews, July 1990).  
(continues)







Months on chart	Last month	This month	<b>HARD DISKS*</b>	
6	2	1	<b>MacStack SD40</b>	CMS Enhancements
8	3	2	<b>Apple Hard Disk 40SC</b>	Apple Computer
34	1	3	<b>Apple Hard Disk 20SC</b>	Apple Computer
1	—	4	<b>Platinum PI 40 External</b>	CMS Enhancements
9	—	5	<b>MacStack SD30</b>	CMS Enhancements

This is how the hard disk category should have read in August's Best-Sellers.

### TV Is Not the Culprit

Most of Steven Levy's complaints about the intellectual inadequacies of the TV generation have an element of truth. But he points the finger at TV as the culprit, when in fact the culprit is the education system in this country. The real reason most people can't reason well or think critically is that the schools fail

to teach these skills. The simple act of watching TV does not destroy the ability to think clearly. Video does not stifle rational thought simply because it combines pictures with sound, as Levy claims.

Steven Levy has fallen into the intellectual trap of believing that written language is the only acceptable medium for rational dis-

course. What he forgets is that great minds somehow have managed to express their thoughts in other media—for thousands of years. Written language is not the sole medium of the human intellect. Is Shakespeare, who worked in the multimedia idiom of the theater, less worthy than Dickens, who wrote monomedia novels? Did Stravinsky and Balanchine miss the boat by expressing themselves through collaborations in music and choreography instead of the written word? Would Levy prefer to read a novel by Stravinsky or perhaps a corporate annual report by Balanchine?

True enough, the bulk of TV programming is guilty of the crimes Levy describes—but so are all other

media, including the written word. The problem is not which medium we use but how we use any particular medium or combination of them. If Levy wants to stop the growing trend toward shallow, superficial thinking in our society, he should support the teaching of the vocabulary, grammar, and syntax of as many media as possible, from the written word to music, dance, architecture, graphic arts, and (gasp) even video. By denying that responsibility and wishing that other media didn't exist, we will perpetuate the problem, not cure it.

I love the written word, but I recognize that it is only one of the many acceptable media through which human beings com-  
(continues)

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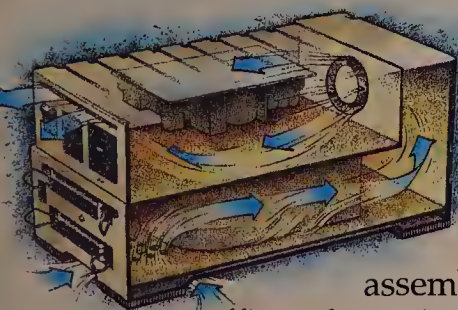


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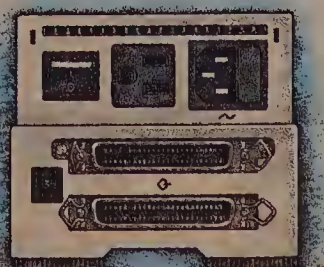
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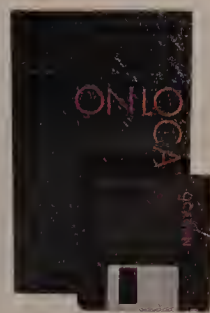
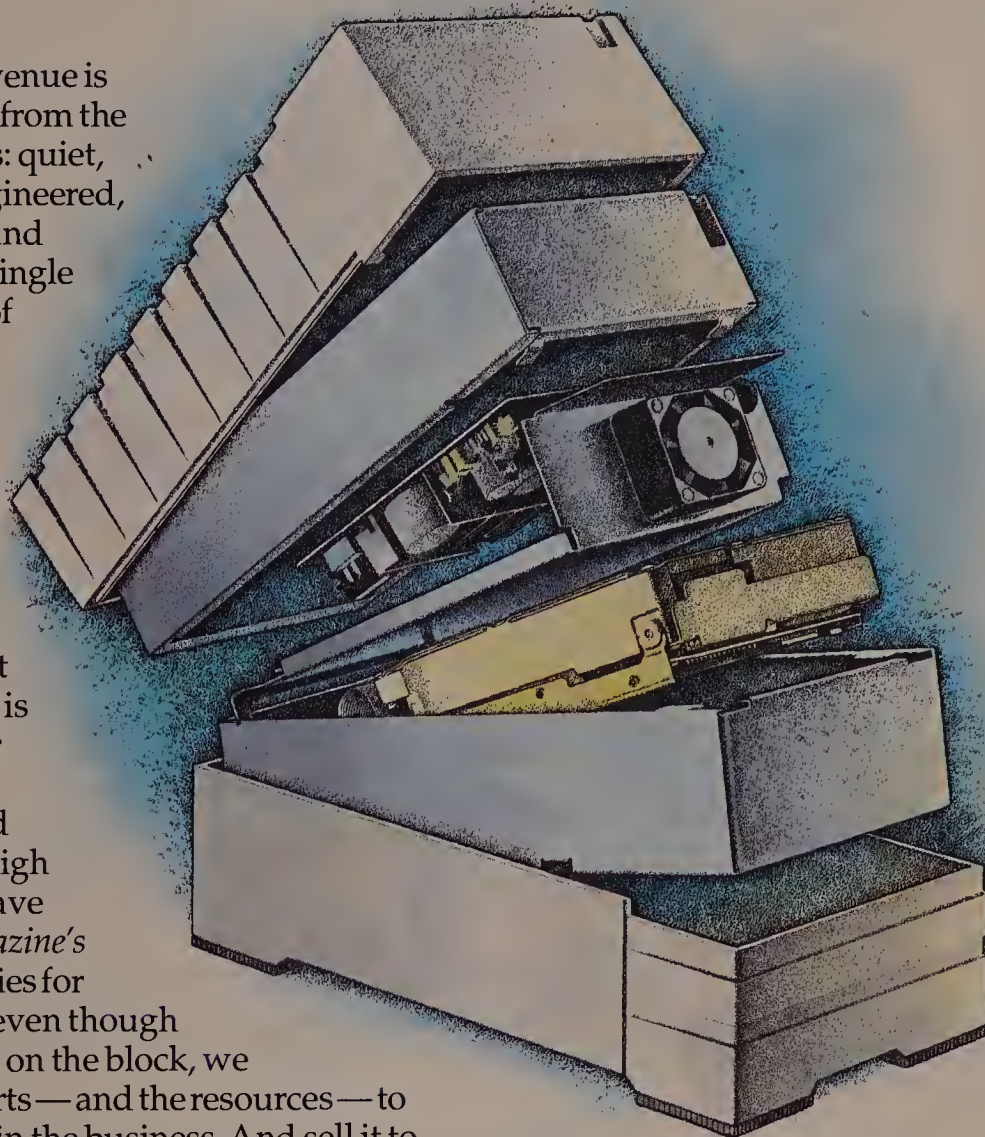
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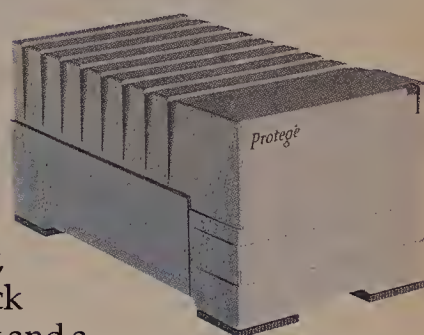
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municate thoughts. In fact, many kinds of thoughts actually require other media for full expression. Commenting on people who insist they don't need to listen to a musical performance because they can "hear" it in their minds by reading the sheet music, the English composer Ralph Vaughan Williams asked what the effect on Ulysses would have been if, instead of singing to him, the Sirens had simply handed him a copy of the score.

Steven T. Birchall  
Merrimack, New Hampshire

### Online Monopoly

Wow! What a wonderful idea Steven Levy has in a monopoly online service [*The Iconoclast*, May 1990]. All we have to do is look at other monopoly services run

by corporations and the government to see what wonderful things we can look forward to with Levy's proposed OneNet:

No more problems with confusing innovation. Whatever interface gets chosen first will be *the* interface we'll all come to know and love for decades on end, or until the Consumer Interface Committee can come to an agreement on upgrades.

No more superquick signing up, which can lead to people getting too much service before they have time to stop and think about it. New customers can be asked to keep their computers idling and their modems set to autoanswer continuously from 8 a.m. to 5 p.m. so that the service rep can make the connection at OneNet's convenience.

Since OneNet will be a public utility, it will provide employment opportunities for lawyers and accountants every time the service wants to raise its rates or change its service structure, subject to approval by the consumer governing board.

Oh, and we just know the regulatory agency will be supercompetent and incorruptible, based on the wonderful track record of agencies regulating all our other wonderful monopolies like the U.S. Postal Service, local phone and utility companies, and the insurance cartel.

Scott32  
via America Online

### Liberty Drive Is a Winner

In "Midrange Hard Disks" (June 1990) you say the EMAC Impact and the Liberty drive are both fast and

lightweight but neither product has *anything* special to recommend it over La Cie's Cirrus, FWB's PocketHammer, or Maxcess's V-Series.

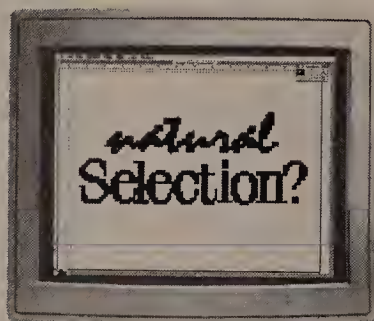
What about portability? The Liberty drive is less than half the size of any of the aforementioned drives. Its extremely small size has our customers frequently using the word *addicted*. How could such a strong feeling be engendered and yet *Macworld* not see the value?

Howard Winther  
President, Liberty Systems

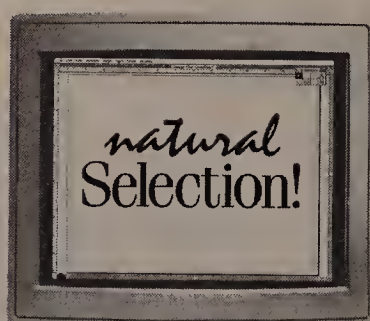
We originally classed the Liberty as a good, but not great value. After considering the points you've raised and taking an informal survey of *Macworld* staffers, we've since decided it qualifies as a winner. It truly is noticeably smaller and lighter than the other drives.—Ed.

(continues)

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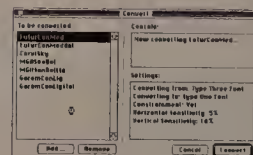
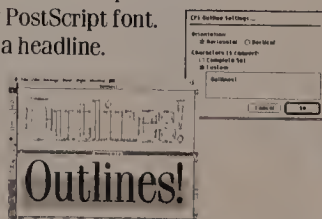
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### DesignStudio's Greatest Strength

**D**esignStudio has the most powerful—and flexible—style sheets of any page-layout program. Because your reviewer ["Picking a Publishing Program," May 1990] hadn't figured out that a style sheet need not specify every attribute, he labeled as DesignStudio's greatest weakness what is possibly its greatest strength.

I seldom specify a type style in a style sheet so that I can change formatting, such as italics or boldfacing, without removing the style sheet, which answers the author's biggest gripe. Or I'll sometimes specify just one attribute—to turn off indents on opening paragraphs, for example, since one style sheet will override another without having to remove the first.

DesignStudio's style sheets are superior because you can apply them to single words instead of entire paragraphs. For instance, when I use Times I like to tighten up the bold but not the plain type. So I create a separate style sheet just for the bold—applying it is as simple as selecting bold to begin with—and once it's applied I can tighten or loosen all the bold type in the document through a single dialog box. Or you can create a style sheet that puts footnote numbers in a smaller size and shifts them up, all with a keystroke. And with the program's powerful search-and-replace function, you can even apply a style sheet to all the bold type in a document after the fact.

*Jon Marken  
Hampden-Sydney, Virginia*

### Maximum Exposure

**I** want to point out that this is a serious letter; I am not attempting to be amusing.

I have been using computers for several years now. After spending hours on end in front of computers, I began to notice that my nylon/rayon underwear would get holes in the crotch and eventually fall apart. It was almost as if they had been dipped in acid.

At first I did not associate this with my computer but assumed that the quality of underwear was deteriorating. A year or so after my underwear began to look like Swiss cheese, I mentioned it to my brother-in-law, a computer programmer. He said this was a common problem for men working a lot with computers. It had evidently happened to him and to his

associates.

I realize that people do not usually talk to others about the state of their underwear, but have you ever heard of this happening? If computers can do this to nylon/rayon underwear, what are they doing to the human body? I would be grateful for any information on this subject.

By the way, I haven't seen a single hole since I switched to cotton!

*Hal Bonillas  
Anderson, California*

How about it, readers? Has anyone experienced a similar problem? This is the first we've heard of it.—Ed.

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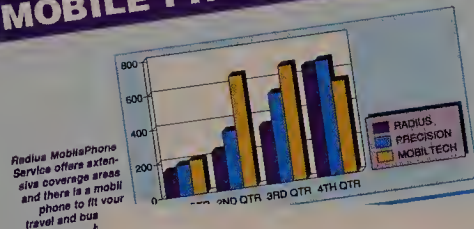
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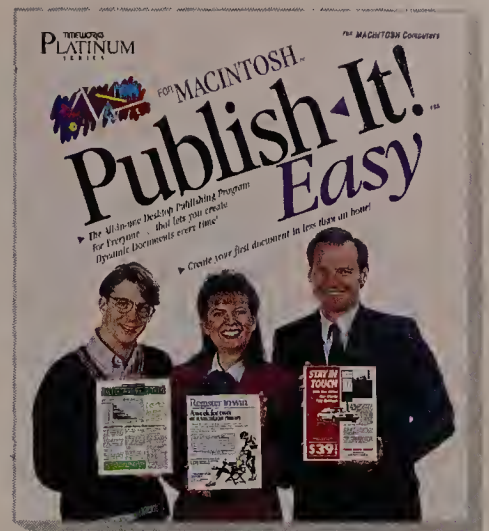
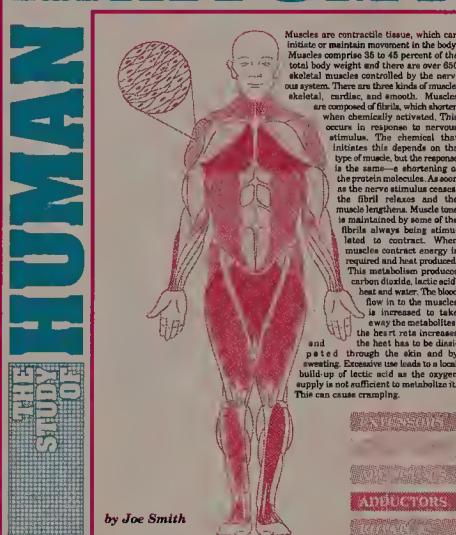
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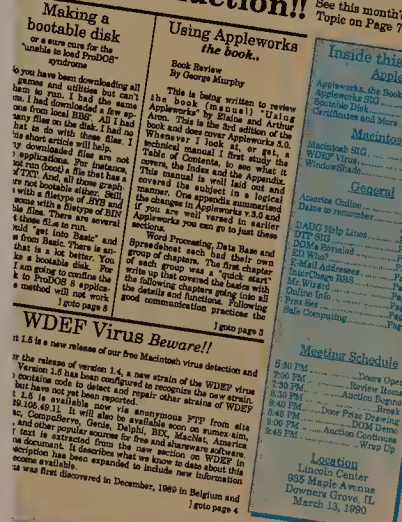
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nouncements about new software versions. And it's a good thing, too, since this is one of the few ways registered users get the news.

I own about 300 programs—all registered—from about 125 software companies, and I can count on one hand the number that regularly inform their registered users of upgrades. I've spent my whole career in sales, and I learned a long time ago that 60 percent of your sales come from installed base.

During the past year, I have ordered at least one software update from each upgrade document I have received. Need I say more?

Alan Applegate

Lakewood, Colorado

### Star Trek Lives!

There is a clever message hidden on *Macworld's*

June cover, which indicates that Cathy Abes and Jerry Borrell are either brilliant Federation agents or unwitting dupes of Drew Huffman (or that Motorola has a great sense of humor). If you look closely at the chips in the illustration, you can see a not-so-subtle reference to the famed line of starships (made famous by the TV show "Star Trek") known as Enterprise—whose registry has always been NCC-1701.

Given the prevalence of Trekkies in the Mac community, I imagine you have received a number of comments like mine. I'm curious, though; was this intentional, or just a happy coincidence?

Matthew C. Brush

Owings Mills, Maryland

It was no coincidence, but Huffman, who created the model, was not the

culprit. Eliot Smyrl of Pixar added that bit of Trek lore when he rendered the image.—Ed.

### Praise for CompileIt

Thanks to Bruce Webster for the excellent look at Mac software development [*State of the Mac*, June 1990], which provided an insightful perspective of the programming environments as well as future trends. But I would like to have seen mention of Tom Pittman's CompileIt (Heizer Software), which can add power to HyperCard or SuperCard.

In addition to compiling HyperCard scripts into an often faster XCMD/XFCN, CompileIt provides access to all the 800+ ROM Toolbox calls, all the documented constants, most of the data structures in *Inside Macintosh*, and not a few of the

"Not in ROM" calls. It also knows about all the SuperCard callbacks.

The manual provides enough information for the fairly competent HyperCard scriptwriter to compile scripts into successful externals, and familiarity with *Inside Macintosh* opens the door to accessing the Toolbox.

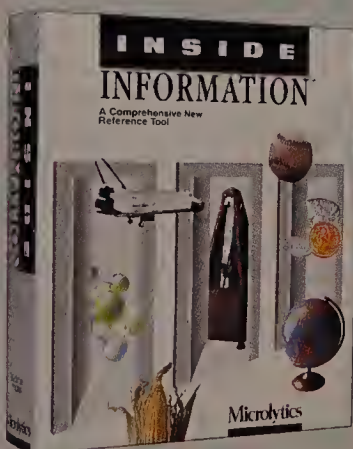
Brian Benison

Glendale, California

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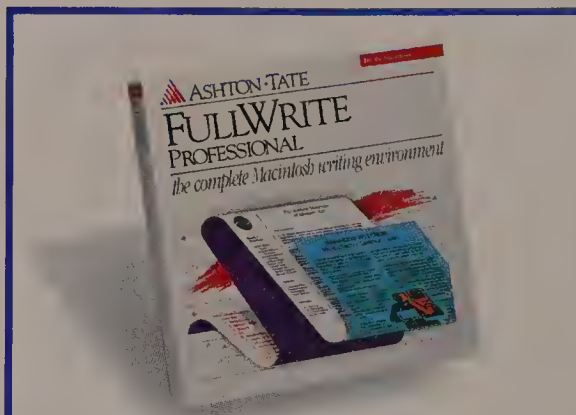
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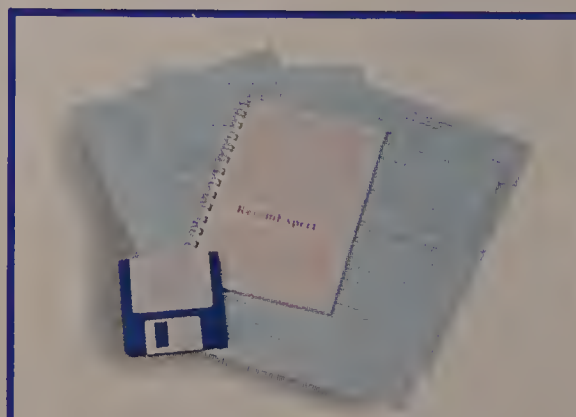


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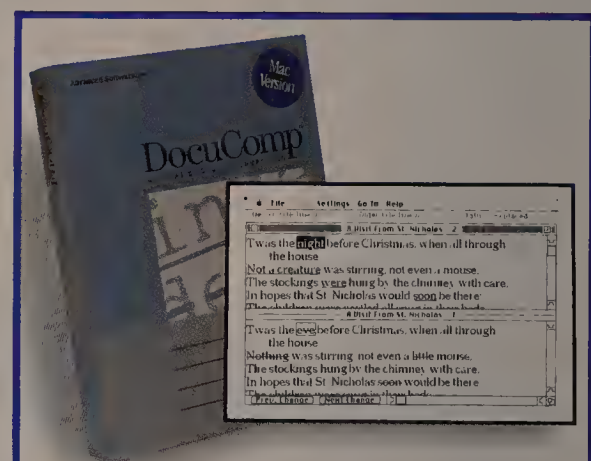
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1769 Canvas 2.1 ..... 189.



## Innovative Data Design

2417 *MacDraft 2.0*—Powerful precision drawing and design software for the Macintosh. Features include advanced text handling, on-line symbol libraries, layers, Bezier and spline curves, dimensioning and more ..... \$193.

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of the Macintosh Marketing Association, Inc.

# MacConnection®

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791



# By changing the

## ★Dream Maker ... 30 day MBG

- 4088 MacGallery (MacPaint) ..... \$27.  
 Cliptures: Business 1 or 2 ... each 69.

### Dubl-Click Software

- World-Class Fonts! ..... each 42.  
 WetPaint Clip-Art ..... each 42.

## ★Electronic Arts ... 30 day MBG

- 5289 Studio/1 1.0 ..... 96.  
 4315 Studio/8 1.0 ..... 295.

## ★Farallon Computing ... 30 day MBG

- 4684 ScreenRecorder 1.0 ..... 125.  
 6770 MacRecorder Voice Digitizer ..... 89.  
 2199 MacRecorder 2.01 ..... 159.

## ★Foundation Publishing ... 60 day MBG

- Comic People Vol. 1 or Vol. 2 ... ea. 21.  
 6728 Comic Strip Factory 1.6 ..... 37.

### Frame Technology

- 7505 FrameMaker ..... 749.

## ★Generic Software ... 60 day MBG

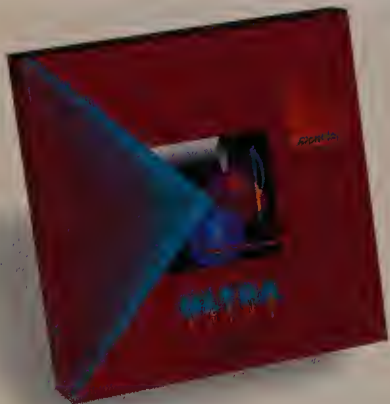
- 4319 Generic CADD 1.1 (Level 1) ..... 83.  
 7454 Generic CADD 1.0 ..... 375.

## ★Good Software ... 30 day MBG

- 5428 NuPaint 1.0.4. .... special 69.

### Image Club Graphics

- 7523 Evolution ..... 49.



## Deneba Software ... 30 day MBG

6365 *UltraPaint 1.0*—B&W and color painting, gray scale editing & object drawing in one program. MacPlus' experience high res painting & every tool imaginable. Mac II's come alive with millions of colors & gray scale editing ... \$125.

### Innovative Data Design

- 2417 MacDraft 2.0. .... 193.  
 4707 Dreams 1.1 ..... 319.

### Letraset

- 2619 ImageStudio 1.5 ..... 139.  
 2621 Ready Set Go! 4.5A ..... 165.  
 4709 LetraStudio 1.5 ..... 275.  
 6300 FontStudio 1.0 ..... 459.  
 6302 DesignStudio 1.0 ..... 599.  
 6301 ColorStudio 1.0 ..... 1579.

## ★Linguist's Software ... 60 day MBG

Over 100 language fonts ..... call  
 MacKanji 6.0, MacChinese,  
 LaserHebrew, or LaserGreek each 79.

## ★MacroMind ... 30 day MBG

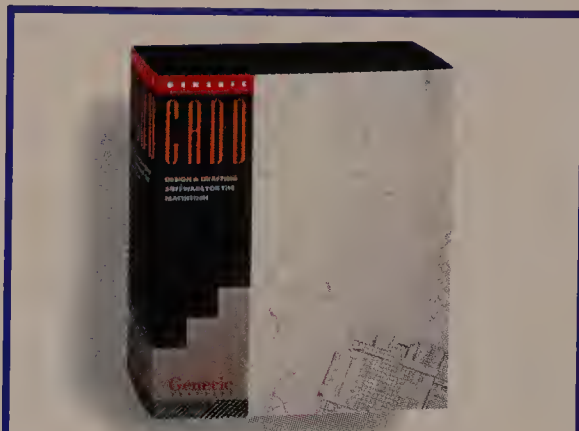
- 6159 MacroMind Accelerator ..... 125.  
 5087 MacroMind Director 2.0 ..... 439.

## ★MicroMaps ... 30 day MBG

- 5516 MacAtlas 2.0 (MacPaint) ..... 45.  
 5514 MacAtlas EPSF 1.0 (PostScript) ... 105.  
 5513 MacAtlas Professional 1.0 (PICT) ... 105.

## ★Microsoft ... 30 day MBG

- 2878 PowerPoint 2.01 ..... 245.



## Generic Software ... 60 day MBG

7454 *Generic CADD 1.0*—Only Generic CADD has the combination of simplicity and power to stay with you from first inspiration to finished drawing. Top performance for the bottom line. .... \$375.

### NEC

- Image Gallery, Photo Gallery, Type  
 Gallery PS (CD-ROM titles) . each 246.  
 6625 Clip-Art 3D (CD-ROM) ..... 246.

### Olduvai

- 7120 VideoPaint 1.0 ..... 279.

### PANTONE

- 7466 Process Color Imaging Guide ..... 49.

### Paracomp

- 7421 DrawTools 1.0 ..... 62.  
 4597 Swivel 3D 1.1 ..... 295.  
 7441 Swivel 3D Professional 1.0 ..... 439.

## ★Preferred Publishers ... 30 day MBG

- 5751 Exposure 1.03 ..... 52.

### Quark

- 3230 Quark XPress 2.12 ..... 469.

## ★Silicon Beach ... 60 day MBG

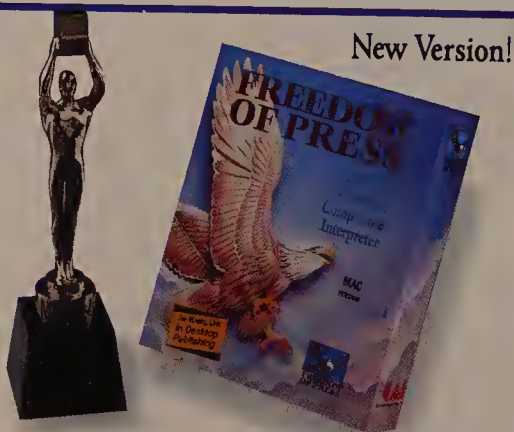
- 3506 SuperPaint 2.0 ..... 125.  
 6674 Personal Press ..... 199.  
 3980 Digital Darkroom 1.1 ..... 248.  
 3507 Super3D 2.1 ..... 315.

### Softview

- 7499 if:X Forms Designer 1.0 ..... 169.

## ★Solutions, Inc. ... 60 day MBG

- 3446 The Curator 1.05 ..... 71.



## Custom Applications ... 30 day MBG

6517 *Freedom of Press 2.4*—1989 MacUser Editors' Choice Awards for Software Product of the Year and Best Graphics/Publishing Utility. Brings PostScript-printing capabilities to non-PostScript output devices. .... \$255.

## ★Somak Software ... 30 day MBG

- 7434 LaserArt CD-ROM Volume 1 ..... \$62.

## ★Springboard ... 30 day MBG

- 3530 Certificate Maker 2.0 ..... 22.  
 4497 Top Honors 1.01 ..... 57.  
 4500 Springboard Publisher II 2.0 ..... 107.

### Strategic Mapping

- 6518 ATLAS-MapMaker 4.5 ..... 369.

## ★SuperMac Tech. ... 60 day MBG

- 3380 PixelPaint 2.0 ..... 225.  
 5625 PixelPaint Professional 1.0 ..... 389.

### 3G Graphics

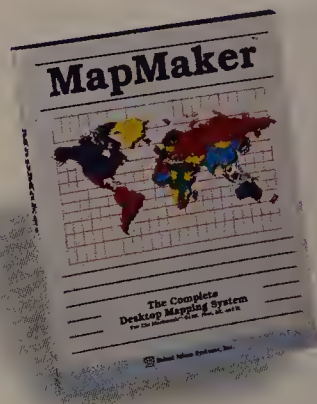
- 3942 Images with Impact: Graphics 1 ... 50.  
 4583 Images with Impact: Business 1 ... 65.  
 6379 Images with Impact: Accents ..... 65.

## ★Timeworks ... 30 day MBG

- 7115 Publish It! Easy 1.1 ..... 113.  
 5908 Publish It! 1.2 ..... 222.

## ★T/Maker ... 30 day MBG

- 6900 ClickArt Business Cartoons ..... 32.  
 3633 ClickArt Christian Images ..... 39.  
 5167 EPS Business Art ..... special 69.  
 7424 EPS Animals & Nature ..... 82.



## Strategic Mapping

6518 *ATLAS-MapMaker 4.5*—Publication quality color maps of your data. Includes boundaries and data for states, counties, world countries. Plots locations and data for ZIP-coded address files. *MacUser* Five Mice rating ..... \$369.

## ★Wayzata Tech. ... 60 day MBG

- 6576 Vietnam Remembered (CD-ROM) ... 69.  
 6370 Quick Art (CD-ROM) ..... 175.

## ★Wildflower ... 30 day MBG

- 6512 SnapJot 2.0 ..... 32.

## ★Zedcor ... 60 day MBG

- 3986 DeskPaint & DeskDraw 3.0 ..... 115.

## TOOLS OF THE TRADE

### ★Abbott Systems ... 30 day MBG

- 5236 CanOpener 1.1 ..... 63.

### ★Affinity Microsystems ... 60 day MBG

- 1016 Tempo II 1.02 ..... 93.

### ★Aladdin Systems ... 30 day MBG

- 6169 Shortcut 1.0.2 ..... 46.  
 6740 StuffIt Deluxe 1.0 ..... 63.  
 7504 Programmer's Assistant 1.0 ..... 57.

### ★ASD Software ... 30 day MBG

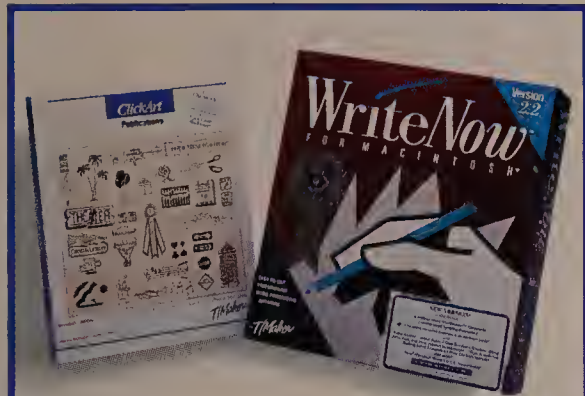
- 7085 FileGuard Extended 2.5 (1 user) ... 145.  
 7422 FileGuard Extended 2.5 (5 user) ... 349.  
 7423 FileGuard Extended 2.5 (10 user) ... 579.

### ★Berkeley Systems ... 30 day MBG

- 5737 After Dark 2.0 ..... 22.  
 1541 Stepping Out II 2.02 ..... 49.



# way that we pack.



## T/Maker ... 30 day MBG

3639 WriteNow 2.2—With your purchase of the Eddy award winning word processor, WriteNow 2.2, receive a FREE copy of ClickArt Publications to jazz up your memos, papers, and presentations ..... \$117.

## Borland

1511 Turbo Pascal 1.1 ..... 68.

## ★Bravo ... 30 day MBG

5404 SPAMM 1.1 ..... 48.

## ★Casady & Greene ... 60 day MBG

2269 QuickDEX 1.4D ..... 31.

7443 A.M.E. 1.0 ..... 159.

7444 A.M.E. 1.0 (5 user) ..... 509.

## ★CE Software ... 60 day MBG

4689 MockPackage Plus Utilities 4.4 ..... 31.

1727 CalendarMaker 3.0 ..... 31.

6278 DiskTop 4.0 ..... 63.

1729 QuickKeys 1.2 ..... 63.

7518 Alarming Events 1.0 ..... 85.

## ★Central Point ... 30 day MBG

5040 Copy II Mac 7.2 ..... 23.

5041 Mac Tools Deluxe 1.1 ..... 75.



## Computer Associates/Cricket

1670 CA-Cricket Presents 2.0—Using CA-Cricket Presents' robust, automated features is the quickest way to integrate text, charts and graphics to create persuasive visuals for high impact presentations ..... \$319.

## ★Connectix ... 30 day MBG

6123 Virtual 2.03 (for SE/30, Ilcx, Ilx, & Ilci) \$115.

6122 Virtual 2.03 (for Mac II, incl. PMMU) . 188.

## ★Dantz Development ... 30 day MBG

5255 Retrospect 1.1 ..... 148.

## ★Digitalk ... 60 day MBG

5166 SmallTalk/V Mac 1.1 ..... 124.

## Dubl-Click Software

1824 Calculator Construction Set 2.05. . . 45.

## ★Fifth Generation ... 30 day MBG

4287 PYRO! 4.0 (screen saver) ..... 25.

3955 Suitcase II 1.2.6 ..... 49.

FastBack II 2.1 or DiskLock 1.0.2. . 118.

## ★Foundation Publishing ... 60 day MBG

6701 HyperSpeller 1.0 ..... 29.

## ★HJC/Microcom ... 30 day MBG

4803 Virex 2.7 ..... 56.

5885 Virex (10 Pack) ..... 329.

## Hyperpress Publishing

4233 Icon Factory 1.0 ..... 45.

## ICOM Simulations

4084 On Cue 1.3. .... 35.

5681 HyperTMON 1.0. .... 58.

4085 TMON 2.8.4 ..... 87.

## Individual Software

4719 101 Scripts & Buttons HyperCard 1.2 35.

## ★Insight Development ... 30 day MBG

6171 MacPrint 1.3. .... 94.

## ★JAM Software ... 30 day MBG

6089 Smart Alarms w/Appt. Diary 3.0.1. . 49.

6088 Smart Alarms 3.0 (1-4 users). . . . 99.

## ★Kent Marsh Ltd. ... 30 day MBG

5457 QuickLock 2.0 ..... 34.

2591 The NightWatch 1.03 ..... 85.

6134 MacSafe II. .... 107.

## ★Kiwi Software ... 60 day MBG

6267 KiwiEnvelopes! 3.0 ..... 34.

7445 KiwiFinder Extender 1.0 ..... 65.

## ★Leister Productions ... 30 day MBG

7126 Reunion 1.6 ..... 89.

## ★Loop Software ... 30 day MBG

5442 PictureBook 3.2 ..... 39.

## Magic Software

7267 AutoSave II 1.1 ..... 28.

7268 POWERicons 1.0 ..... 39.

7270 Backmatic 1.1 ..... 50.

## ★Microcom ... 30 day MBG

7459 CarbonCopy Mac (Single, 2 req.) . 117.

7465 CarbonCopy Mac (Twin Pack). . . . 169.

## ★Microlytics ... 60 day MBG

2732 GOfer 2.0 ..... 45.

## ★Microseeds Pub. ... 60 day MBG

7068 INITPicker 2.0. .... 35.

2913 Redux 1.62. .... 49.

7116 Rival 1.1 ..... 49.

## ★Microsoft ... 30 day MBG

4471 QuickBasic 1.0 ..... 64.

## ★Millenium Software ... 30 day MBG

6105 HyperX 3.0. .... 65.

## ★Now Software ... 30 day MBG

6924 ScreenLocker 1.0 ..... 45.

6925 Now Utilities 1.0 ..... 89.

6739 Prototyper 2.1 ..... 184.



## Softview

7499 if:X Forms Designer 1.0—This program does for forms creation what word processing did for typing. With "Graphics Intelligence" your form layout can be done right—the first time! ..... \$169.

## Oiduvai

4503 MultiClip 2.0 ..... 49.

## ★ON Technology ... 1 year MBG

6385 On Location 1.0 ..... 75.

## ★Peter Norton ... 30 day MBG

6748 Norton Utilities for the Mac 1.0 . . . . 84.

## ★Salient Software ... 30 day MBG

7404 Disk Doubler 2.0. .... 45.

7403 Partner 1.01 ..... 56.

## ★Silicon Beach ... 60 day MBG

5100 SuperCard 1.5 ..... 189.

## ★Softstream int'l., inc. ... 30 day MBG

5440 HyperHIT 2.2 ..... 125.

7450 HyperHIT Relational. .... 269.

## ★Software innovations ... 30 day MBG

5869 HandOff 1.1 ..... 31.

6647 HandOff II. .... 52.



## RightSoft

7482 RightWriter Mac 3.1—A sophisticated system that will generate a marked-up copy of your documents with comments pointing out errors in grammar, style, word usage and punctuation ..... \$54.

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# Just paper and boxes.

## ★Solutions, Inc. ... 60 day MBG

- 3448 SmartScrap & The Clipper 2.1 ... \$45.  
3449 SuperGlue II 2.01 ... 61.

## ★Somak Software ... 30 day MBG

- 5897 ScriptEdit 1.1 ... 49.  
7430 SharpenUp 1.0 ... 62.

## ★Spinnaker ... 30 day MBG

- 6692 PLUS 2.0 ... 115.

## ★SuperMac Tech. ... 60 day MBG

- 3383 SuperSpool 5.0 ... 58.  
3382 SuperLaserSpool 2.02 ... 87.  
3378 SuperLaserSpool 5-Pack 2.02 ... 289.  
3377 DiskFit 1.5.1 ... 58.  
3379 Network DiskFit 1.5 ... 225.

## ★Symantec ... 30 day MBG

- 4644 Just Enough Pascal 1.0 ... 52.  
5176 Symantec AntiVirus for Mac (S.A.M.) ... 67.  
5724 Symantec Utilities for Mac (S.U.M.) ... 99.  
3421 THINK Pascal 3.0 ... 165.  
3420 THINK C 4.0 ... 165.

## ★Symmetry ... 30 day MBG

- 3318 HyperDA 1.2 ... 45.

## ★Synex ... 30 day MBG

- 7147 MacEnvelope 5.0 ... 57.  
6666 MacEnvelope Plus 2.0 ... 159.

## ★TGS Systems ... 30 day MBG

- 6667 Prograph 2.0 ... 249.



## SuperMac Tech. ... 60 day MBG

3377 DiskFit 1.5.1—Copy and backup the contents of your hard drive quickly and automatically onto floppies, cartridges, or other hard drives. Multifinder compatibility allows you to keep working while you backup ... \$58.

## ★Beacon Technology ... 30 day MBG

- 6426 Gems of The Word 1.0 (King James) ... 25.  
7442 Gems of The Word 1.0 (New Int'l.) ... 25.  
4967 HyperBible 1.0 (King James) ... 145.  
4968 HyperBible 1.0 (New International) ... 175.

## ★Bogas Productions ... 60 day MBG

- 6135 Super Studio Session w/Music Library ... 99.

## Bright Star Technology

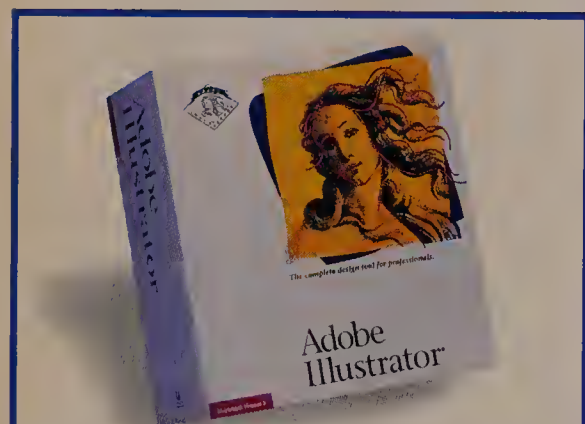
- 3961 Talking Tiles 1.0 ... 26.  
1402 Alphabet Blocks 1.0 ... 30.

## Broderbund Software

- 4314 Type! 1.0 ... 18.  
5886 Star Wars (CP) ... 23.  
4540 Ancient Art of War at Sea (CP) ... 26.  
6516 The Playroom (CP) ... 29.  
4229 Where/World Carmen Sandiego? (CP) ... 29.  
5755 Where/Europe Carmen Sandiego? (CP) ... 29.  
5233 Where/USA Carmen Sandiego? (CP) ... 29.  
4966 SimCity 1.2 (CP) ... 29.  
5871 SimCity Supreme 1.2C ... 47.  
Geometry 1.2 (CP), Physics 1.2 (CP),  
Calculus 1.2 (CP) ... each 58.  
5237 Whole Earth Catalog (CD-ROM) ... 89.

## ★Bull City Software ... 30 day MBG

- 5841 Moriarty's Revenge (CP) ... 32.



## Adobe Systems

1137 Illustrator 3.0—New text-handling tool allows for direct, on-screen entering and manipulation of text. Also, control every aspect of the characters, including kerning, text on a curve and access to typeface outlines ... \$349.

## ★TML Systems ... 30 day MBG

- 3549 TML Pascal II 3.1 (w/MPW 3.1) ... 109.

## True BASIC, Inc.

- 3587 True BASIC 2.02 ... 55.

## ★Williams & MacIsaac ... 30 day MBG

- 6926 myDiskLabeler III 3.0 ... 49.  
4976 StickyBusiness 1.2 ... 89.  
6927 StickyBusiness Plus 1.2 (bar codes) ... 149.

## ★Zedcor ... 60 day MBG

- 3985 ZBasic 5.0 ... 88.

## LEARN & PLAY

### Access Software

- 4655 World Class Leader Board Golf ... 25.

### Activision

- 4486 Manhole ... 28.  
5127 Manhole (CD-ROM) ... 34.  
5517 Cosmic Osmo ... 40.

## ★Ars Nova ... 30 day MBG

- 1215 Practica Musica 2.2 ... 69.



## HJC/Microcom ... 30 day MBG

4803 Virex 2.7 with the Virex INIT—Both detects and repairs files infected by all known Mac viruses. The Virex INIT continuously monitors the computer to prevent infection. ... \$56.  
5885 Virex 10 Pack ... 329.

## Bullseye

- 1545 Fokker Triplane 2.02 (CP) ... \$23.  
1544 Ferrari Grand Prix (CP) ... 31.  
4074 P51 Mustang Flight Simulator (CP) ... 31.

## Carina Software

- 5726 Voyager 1.2 ... 88.

## ★Casady & Greene ... 60 day MBG

- 2268 Crystal Quest 2.2X ... 25.  
4119 Crystal Quest w/Critter Editor 2.2X ... 39.  
7495 Mission Starlight ... 29.  
7498 Sky Shadow ... 29.

## Coda Music Systems

- 5854 MusicProse 1.01 ... 187.  
5604 Finale 2.0 ... 549.

## Davidson & Associates

- 1734 Math Blaster! 1.0 (CP) ... 29.  
6128 Math Blaster Mystery (CP) ... 29.

## ★Electronic Arts ... 30 day MBG

- 6716 Pipe Dreams ... 17.  
6297 Halls of Montezuma ... 26.  
6663 Sands of Fire ... 32.  
4064 Chuck Yeager Flight Simulator ... 32.  
6594 Starflight ... 39.  
1846 Deluxe Music Construction Set 2.5 ... 84.



## Timeworks ... 30 day MBG

Publish It! & Publish It! Easy—The first desktop publishing programs to fully integrate as many text, graphic and page layout features as in stand-alone programs.

- 7115 Publish It! Easy 1.1 ... \$113.  
5908 Publish It! 1.2 ... 222.

## ★First Byte ... 30 day MBG

- 5294 Puzzle Storybook 1.0 (ages 3-8) ... 27.  
5293 Dinosaur Discovery Kit 1.0 (ages 3-8) ... 27.

## ★Great Wave ... 30 day MBG

- 2276 KidsTime 1.2 (ages 3-8) ... 26.  
5642 KidsMath 1.1 (ages 3-8) ... 26.  
4334 NumberMaze 1.1 (ages 5-12) ... 26.  
2270 American Discovery 2.3 (ages 9+) ... 26.  
2273 ConcertWare+ 4.0 ... 38.  
2271 ConcertWare+ MIDI 5.1 ... 98.

## ★HyperGlott ... 30 day MBG

- Word Torture - Beginner to Advanced (Span., Fren., Germ., Ital. & Rus.) ea. 29.  
Pronunciation Tutor - Beginner (Spanish, French, German) ... ea. 35.  
Verb Tutor - Intermediate (Spanish, French, German) ... ea. 42.  
6604 Verbal Aspect - Inter. (Russian) ... 42.  
7472 Russian Noun Tutor (w/sound) ... 59.  
6611 Kanjimaster - Beg. (Japanese) ... 105.  
7473 Learn to Speak French (CD-ROM) ... 175.

## Individual Software

- 7425 Training for Microsoft Word 4.0 ... 26.  
4990 Training for PageMaker 3.0 ... 26.



# Nothing obnoxious.



## HyperGlot ... 30 day MBG

7473 *Learn To Speak French* (CD-ROM)—Parlez! A complete French course with 35 interactive lessons on two CD-ROMs. Four native speakers reading dialogues based on the Foreign Service Institute curriculum. Perfect learning tool \$175.

## ★Inline Design ... 30 day MBG

5870 *Bomber 1.3* (includes headphones) 32.

## ★Knowledge Revolution ... 90 day MBG

7310 *Interactive Physics* ..... 169.

## ★Learning Company ... 30 day MBG

2670 *Reader Rabbit 2.2* (CP) (ages 4-7) . . 30.

5453 *Talking Math Rabbit 1.0* (ages 4-7) . 30.

## MicroProse

4697 *Pirates!* (CP) ..... 35.

## ★Microsoft ... 30 day MBG

2868 *Flight Simulator* (CP) ..... 32.

## Miles Computing

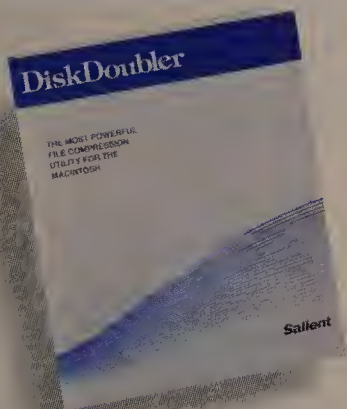
5253 *The Puzzle Gallery* ..... 26.

2765 *Fool's Errand* ..... 32.

## Mindscape

4083 *Balance of Power 1990* (CP) ..... 29.

3987 *Colony* (CP) ..... 29.



## Salient ... 30 day MBG

7404 *Disk Doubler 2.0*—Expand your disk drive capacity. Fast, easy and safe, Disk Doubler dramatically increases the storage capacity of any Mac drive. "Performance is outstanding" evaluates *MacUser*, 7/90. (4½ Mice rating) . \$45.

4596 *Deja Vu II* (CP) ..... \$29.  
2743 *Crossword Magic* (CP) ..... 29.

## ★Penton Overseas ... 30 day MBG

*VocabuLearn/ce Levels I & II*  
(French, Italian, Spanish, German, Russian, Hebrew, & Japanese). ea. 35.

## ★Personal Training Sys. ... 60 day MBG

*MacConnection* carries the entire line of PTS modules for Excel 2.2, Word 4.0, HyperCard, Persuasion 2.0, PageMaker 4.0, Illustrator 88, FileMaker II, FreeHand 2.02, and the Macintosh . . . . each 52.

## Postcraft

7395 *Citadel Secrets* ..... 9.

6466 *Citadel* ..... 26.

## Premier Technology

5773 *Strategic Conquest Plus 2.0* ..... 34.

5774 *NetTrek—The Real Version 2.3* . . . 34.

## Sierra On-Line

7366 *Thexder* ..... 21.

3397 *Leisure Suit Larry* (CP) ..... 23.

5694 *Manhunter: San Francisco* (CP) . . . 28.

5458 *Manhunter: New York* (CP) ..... 28.

3396 *King's Quest III* (CP) ..... 28.

7367 *Space Quest III* (CP) ..... 39.

## ★Silicon Beach ... 60 day MBG

3502 *Beyond Dark Castle* ..... 32.

3503 *Dark Castle 1.1* ..... 32.

## ★Softstream Int'l., Inc. ... 30 day MBG

4071 *Mac•Man* ..... 23.

6258 *MacRummy* ..... 32.

4073 *Colour Billiards* ..... 38.

## ★Software Toolworks ... 30 day MBG

4945 *The Hunt for Red October 1.1* ..... 20.

1842 *Chessmaster 2100 1.1* ..... 32.

4619 *Mavis Beacon Typing 1.3* (CP) . . . 32.

4588 *Life & Death* (CP) ..... 32.

6111 *Cribbage King-Gin King* ..... 39.

## ★Spectrum Holobyte ... 30 day MBG

4001 *Solitaire Royale* ..... 19.

3464 *Tetris 1.1* ..... 19.

6112 *Welltris* ..... 19.

3459 *Falcon 2.2* ..... 30.

## ★Spinnaker ... 30 day MBG

2328 *Sargon IV* (CP) ..... 28.

2329 *SAT Score Improvement 1.0* (CP) . . 57.

## True BASIC, Inc.

3571 *Algebra 3.02* (with workbook) . . . . 45.

## ★Wayzata Tech. ... 60 day MBG

6369 *The World Factbook 1989* (CD-ROM) 69.

7374 *Sport News Baseball Stats* (CD-ROM) 139.

## ★XOR ... 30 day MBG

6152 *TaskMaker* (CP) ..... 27.

6040 *MacGolf Classic* (CP) ..... 52.

## NETWORKS & COMMUNICATIONS

## ★Abaton ... 30 day MBG

6266 *InterFAX 24/96 Modem* ..... 419.

## ★CE Software ... 60 day MBG

5638 *In/Out* (10 user) ..... 187.

5174 *QuickMail 2.2* (5 user) ..... 215.

5173 *QuickMail 2.2* (10 user) ..... 315.



## ASD Software ... 30 day MBG

7085 *FileGuard Extended 2.5*—Protect your hard drives, applications, files/folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Now with system usage audit trail. 5 & 10 user also available. . . . \$145.

## ★CompuServe ... 60 day MBG

1676 *CompuServe Information Service* . . 23.

1673 *CompuServe Navigator 3.0* ..... 49.

1674 *Standard Service/Navigator Bundle* 69.

## Connect, Inc.

5834 *Connect 1.5* for the Macintosh . . . . 63.

## ★DataViz ... 60 day MBG

1823 *MacLink Plus/PC 4.5* ..... 119.

4842 *MacLink Plus/Translators 4.5* ..... 99.

## ★Dove Computer ... 60 day MBG

6758 *DoveFax Desktop* ..... 279.

*FastNet III, SE, or SE/30* . . . . each 375.

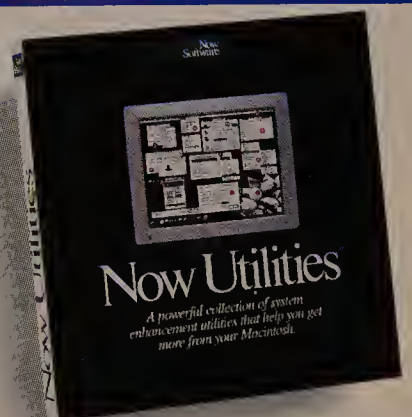
## ★Dow Jones ... 30 day MBG

5295 *News/Retrieval Membership Package* 24.

1785 *Desktop Express 1.03* ..... 95.

## ★Farallon Computing ... 30 day MBG

5707 *Timbuktu 3.1* ..... 95.



## Now Software ... 30 day MBG

6925 *Now Utilities 1.0*—A collection of 12 system enhancement utilities. Flash appointment reminders, display pictures on your Mac, pop-up the menu bar anywhere, make Font menus WYSIWYG, and much more! . . . . . \$89.

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# No more foam



**Dantz Development ... 30 day MBG**  
5255 *Retrospect 1.1*—1989 MacUser Editors' Choice Award for *Best Backup Software*. "Retrospect can quickly store data on almost every backup medium. It also makes backup chores as painless as possible" ..... \$148.

- 4866 Timbuku/Remote 1.0.1 ..... 123.
- 6371 Timbuku/Remote Access Pack .. 845.
- 4867 Timbuku 30-Pack 3.1 ..... 1285.
- 2202 PhoneNET to LocalTalk Adapter ..... 8.
- 5664 PhoneNET StarConnector. .... 17.
- 6273 PhoneNET StarConnector 10-Pack . 129.
- 2203 PhoneNET Connector (DIN-8) ..... 31.
- 4869 PhoneNET Connector 10-Pk (DIN-8) 198.
- 5251 PhoneNET CheckNET ..... 64.
- 2206 PhoneNET StarController 300 ..... 825.
- 6687 PhoneNET StarController-EN .... 1599.
- 5893 Portable Pack ..... 329.
- 6778 Remote/Wakeup Cable ..... 33.
- 6766 MediaTracks ..... 189.
- 6767 MediaTracks Multimedia CD Pack . 319.
- 6768 MediaTracks Multimedia Pack .... 319.

## ★Freesoft ... 60 day MBG

- 6115 White Knight 11.6 ..... 85.
- Hayes**
- 2300 Smartcom II 3.1C ..... 84.
  - 2307 Smartmodem 2400 ..... 349.
  - 6655 V2400 Baud Modem ..... 469.
  - 5991 V9600 Baud Modem ..... 759.

## Insignia Solutions

- 7058 SoftPC-AT/EGA Module ..... 125.
- 4089 SoftPC 1.3 ..... 245.
- 6688 SoftPC for the Mac Portable ..... 245.

## Intel Corporation

- 5119 2400EX Modem ..... 179.
- 6265 2400EX with QuickLink II ..... 195.
- 6420 2400EX MNP Modem. .... 229.
- 6650 2400EX MNP with QuickLink II .. 249.

## ★Microsoft ... 30 day MBG

- 5858 Microsoft Mail 2.0 Workstation. .... 83.
- 5856 Microsoft Mail 2.0 Server. .... 245.

## ★Nuvotech ... 60 day MBG

- 3000 TurboNet ST (DIN-8) ..... 30.
- 6751 TurboNet ST (12-Pack). .... 279.
- 5277 TurboBridge ..... 319.
- 6272 NuvoLink SC ..... 309.
- 6750 NuvoLink II ..... 275.
- 6261 TurboStar ..... 1095.

## Orchid Technology

- 6949 OrchidFAX Modem. .... 459.

## ★Practical Peripherals ... 30 day MBG

- 3102 2400 Baud External Modem ..... 179.
- 5285 PM 2400SA MNP Modem ..... 209.
- 3089 Mac Communications Pack 1.5 .. 225.

## ★Shiva ... 30 day MBG

- 3444 NetSerial X232 ..... \$275.
- 4347 NetBridge. .... 339.
- 4942 TeleBridge ..... 339.
- 3443 NetModem V2400 ..... 429.
- 6917 NetModem V.32 ..... 1429.
- 6519 EtherGate ..... 1629.

## ★Software Ventures ... 30 day MBG

- 3455 MicroPhone II 3.0 ..... 215.

## ★Solutions, Inc. ... 60 day MBG

- 6721 MailMaker 5 User Pack 1.1 ..... 117.
- 4308 BackFAX (reqs. Apple FAX modem). 139.
- 6720 FAXGATE Plus 1.1 ..... 239.

## ★Synergy ... 30 day MBG

- 6618 VersaTerm 4.1.1 ..... 88.
- 6619 VersaTerm-PRO 3.1.1 ..... 174.

## ★TOPS ... 30 day MBG

- 4188 TOPS Teleconnector (DIN8) ..... 23.
- 4598 TOPS FlashBox ..... 118.
- 3723 TOPS Mac 2.1 (limited supply). ... 137.
- 3720 TOPS Flashcard ..... 155.
- 7057 MacPrint TOPS Network Version 1.0 165.
- 6264 TOPS Networking Bundle 3.0 .... 187.

## ★Traveling Software ... 60 day MBG

- 3729 LapLink Mac III Connectivity Pac. . 119.
- 6741 LapLink Mac III Network Pac. .... 185.



## Berkeley Systems ... 30 day MBG

5737 *After Dark 2.0*—New! Over 30 displays & SOUND. Ticking clocks, thunder, munching worms. Use company logo, messages. Great Fish, Flying Toasters, & MultiModule. Random display, & password sleep. .... \$22.

## INPUT/OUTPUT

### ★Abaton ... 30 day MBG

- 7432 300/GS Flatbed Scanner. .... 1099.
- 7433 Scanner Kit w/Digital Darkroom .. 259.
- 7431 Scanner Kit w/ImageStudio. .... 259.

### ★American Power ... 30 day MBG

- 5895 UPS 110SE ..... 209.
- 6686 UPS 370ci ..... 295.

### Apple Computer

- 6717 MIDI Interface. .... 84.
- 6714 Apple Hi Res Color 13" Monitor .. 849.

### Brother International

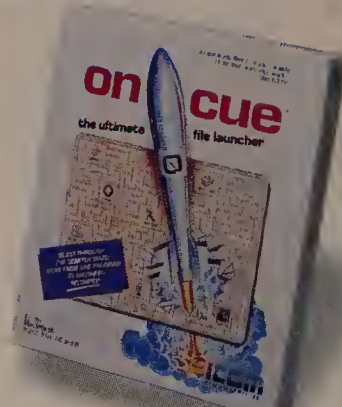
- 6934 HL-8PS Laser Printer ..... 3299.

### Caere

- 4476 OmniPage 2.1 ..... 539.
- OmniSpell or OmniDraft ... each 69.
- OmniTrace or OmniProof. ... each 105.

### ★CH Products ... 30 day MBG

- 7343 Mach IV Plus Joystick (Quad or ADB) 51.
- 7344 RollerMouse (ADB) ..... 79.



## ICOM Simulations

4084 *On Cue 1.3*—Easy-to-use utility which adds a list of programs, and attached documents, directly onto your menu bar so you can move swiftly and easily from application to application. A lifesaver w/MultiFinder \$35.

## ★CoStar ... 30 day MBG

- 6090 LabelWriter ..... 185.
- 6067 LabelWriter Labels ..... 11.
- 7452 LabelWriter Labels (12-Pack) ..... 63.

## ★Datadesk ... 30 day MBG

- 1818 HyperDialer ..... 32.
- 6901 Switchboard (modular keyboard) . 175.
- 6815 Function Key Module ..... 39.
- 6813 Modular Trackball ..... 119.
- MAC-101 Keyboards ..... each 129.

## ★Forte Communications ... 30 day MBG

- 7317 Remote Keyboard/Mouse ..... 289.

## ★GDT Softworks ... 30 day MBG

- 6256 PrintLink Collection 3.01 ..... 59.
- 6151 JetLink Express 1.2 ..... 89.
- 6257 JetLink/Expressive Fonts Bundle. . 159.

## Hewlett Packard

- 6514 HP DeskWriter Printer ..... 859.
- 6689 HP DeskWriter & ATM Bundle. ... 889.

## ★Kensington ... 30 day MBG

- Turbo Mouse 3.0 (Plus or ADB) ea. 109.

## Koala

- 2593 MacVision 3.0 ..... 259.

## Kodak

- 6730 DICONIX M150 Plus Printer ..... 489.



## Software Ventures ... 30 day MBG

3455 *MicroPhone II 3.0*—New version of top-selling telecom software. Build graphic front-ends to remote services & corporate mainframes. Supports XCMDs & XFCNs, ZMODEM, icons, European languages, color & sound \$215.



# peanuts or plastic.

## ★ Kraft Systems ... 60 day MBG

- 7519 KM30 ADB Joystick ..... \$49.
- 6099 ADB Trackball (with foot pedal) .... 79.

## ★ Logitech ... 30 day MBG

- 5082 ScanMan Mac Model 32 ..... 319.

## Magnavox

- 6693 9CM080 14" Color Monitor. .... 529.
- 6690 14" Color Monitor with Micron Xceed for SE/30 (640 x 480) .... special 849.
- 6691 14" Color Monitor with Micron Xceed for Mac II (640 x 480) .... special 849.

## ★ Micron ... 30 day MBG

- 6680 Xceed for SE/30 (640 x 480) ..... 349.
- 6673 Xceed for SE/30 (1024 x 768) ..... 589.
- 7149 Xceed IIci - 128 Cache Card ..... 589.

## ★ MicroSpeed ... 30 day MBG

- 6620 MacTRAC ..... 65.
- 6621 MacTRAC ADB ..... 75.

## ★ Mouse Systems ... 30 day MBG

- 7520 Little Mouse ..... 75.

## ★ Nutmeg Systems ... 30 day MBG

- 6240 30/2 Interface (SE/30 video board) 499.
- 2994 15" Monitor for Mac SE. .... 599.
- 6168 15" Monitor for Mac SE/30 ..... 599.
- 2993 15" Monitor for Mac II ..... 599.
- 4003 19" Monitor for Mac SE. .... 995.
- 7152 19" Monitor for Mac SE/30 ..... 995.
- 4004 19" Monitor for Mac II ..... 995.



## DataViz ... 60 day MBG

1823 MacLink Plus/PC 4.5—Transfer and translate files, in either direction, between the Macintosh and DOS, NeXT, OS/2, and Sun formats. Includes over 100 translators. . \$119.  
4842 MacLink Plus/Translators 4.5 ..... 99.

## TheComplete PC

- 6104 Half-Page Scanner/400 ..... 295.
  - 6103 Full-Page Scanner (w/OmniPage SE) 758.
- ## Thunderware
- 3648 ThunderScan Plus ThunderWorks. 199.
  - 4994 LightningScan 400 ..... 385.

## MEMORY & DRIVES

### 1 Meg SIMMs ... 2 year warranty

- 1107 1 Meg SIMMs (80ns). .... 69.
- 7502 1 Meg SIMMs for Mac IIx (80ns). . . 95.
- 7497 4 Meg SIMMs for Mac IIx (80ns). . . call

### Apple Computer

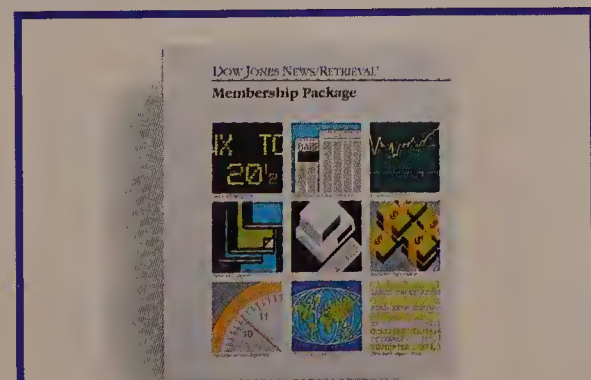
- 6707 Mac Portable 1 Meg. Exp. Kit . . . 429.

### CD Technology

- 6983 CD-ROM Porta Drive ..... 649.

### ★ Cutting Edge ... 30 day MBG

- 3989 800K External Disk Drive ..... 149.
- 5133 20+ Meg Hard Drive ..... 309.
- 3990 30+ Meg Hard Drive ..... 379.
- 3991 45+ Meg Hard Drive ..... 435.
- 5275 60+ Meg Hard Drive ..... 469.
- 5276 80+ Meg Hard Drive ..... 529.



## Dow Jones ... 30 day MBG

5295 News/Retrieval Membership Package—Allows off-line set up of personalized reports to retrieve and analyze key data from Dow Jones News/Retrieval's 55+ databases. Includes five free hours of connect time ..... \$24.

- 5456 45 Meg Removable Drive ..... \$699.
- 5736 45 Meg Removable Cartridge. .... 89.

## ★ Dove Computer ... 60 day MBG

- 1802 Dove Tool Kit. .... 15.
- 1801 SCSI Interface/Port ..... 109.
- 6726 MaraThon MultiComm ..... 319.
- 6725 MaraThon 030 for Mac II. .... 449.
- 6724 MaraThon 030 for SE ..... 449.
- 6723 MaraThon 030 for Plus ..... 449.
- 7305 MaraThon 030 for Mac IIx. .... 449.
- 1809 MacSnap 524S. .... 239.
- 1812 MacSnap 548S. .... 479.
- 7503 Cache Card for Mac IIci ..... 589.
- 6973 MacSnap 2S ..... call
- 6975 MacSnap 4S ..... call
- 1813 MacSnap 8S ..... call

## ★ Kennect Tech. ... 30 day MBG

- 5631 Rapport ..... 195.
- 5632 Drive 2.4 (includes FastBack II) . . . 325.

## ★ Micron ... 30 day MBG

- 7149 Xceed IIci-128 Cache Card ..... 589.



## Dove Computer ... 60 day MBG

6758 DoveFax Desktop—The lowest cost, highest function true background 9600 baud fax/2400 baud data modem. Includes Quick-Fax DA and full-featured Dove software \$279.

## NEC

- 7352 Battery Pack for CDR35 ..... 59.
- 6744 CDR35 CD-ROM Portable Drive . . 399.
- 6743 Mac Driver Kit. .... 64.

## ★ Pacific Rim ... 30 day MBG

- 7382 Platinum 800k Drive ..... 149.

## Quantum

- 7521 Quantum 40 Meg Internal Drive . . 399.
- 7522 Quantum 80 Meg Internal Drive . . 659.

## ★ SuperMac Tech. ... 30 day MBG

- 5447 Dataframe XP 30 Hard Drive. .... 599.
- 5448 Dataframe XP 60 Hard Drive. .... 799.
- 5449 Dataframe XP 100 Hard Drive . . . 1049.
- 7451 Dataframe XP 200 Hard Drive. . . 1399.
- 5451 Dataframe XP 330 Hard Drive. . . 2369.

## Toshiba

- 6749 XM 3201 CD-ROM Drive. .... 899.

## STORAGE MEDIA

### ★ Sony ... 60 day MBG

- 3297 3 1/2" DS/DD Disks (10) ..... 13.
- 6148 3 1/2" DS/DD Disks 3 Pak (30) .... 30.
- 3298 3 1/2" HD Disks 1.44 Meg (10) .... 22.
- 6375 3 1/2" HD Disks 3 Pak (30) ..... 56.
- 6659 QD2000 40 MB Data Cartridge. . . 19.



## Insight Development ... 30 day MBG

6171 MacPrint 1.3—Lets you use any HP printer with your Mac. For a limited time, buy MacPrint 1.3 and get MacEnvelope 4.2, an envelope printing utility, absolutely free. . \$94.

## Olduvai Software

- 3034 Read-It! OCR 2.1 ..... 245.

## ★ Orange Micro ... 30 day MBG

- 3036 Grappler (9 pin) ..... 78.
- 6229 Grappler LX ..... 128.

## Pacific Data Products

- 7412 MacPage PE ..... 459.
- 7411 MacPage ..... 425.

## RasterOps

- 7464 ColorBoard 208 ..... 395.
- 7463 ColorBoard 264 for Mac II. .... 595.
- 7469 ColorBoard 264 for SE/30 ..... 719.
- 7457 Video ColorBoard 364 ..... 1595.
- 7468 ClearVue/GE System for Mac II . . 1759.
- 7458 ColorBoard 708+ 16" Monitor . . 3599.
- 7462 RasterOps 8L ..... 799.
- 7461 RasterOps 24L ..... 3195.

## SAFE Power Systems

- 4561 SAFE 250 Watt Backup. .... 199.
- 6747 SAFE 400S Watt Backup. .... 409.



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## Cutting Edge ... 30 day MBG

45 Meg Removable Drive—Offers the convenience of removable media with the reliability of Winchester technology. Features the popular Syquest mechanism and includes one cartridge ..... \$699.  
45 Meg Removable Cartridge ..... 89.

## ★MAXELL ... 60 day MBG

2792 3 1/2" DS/DD Disks (10) ..... 14.  
2793 3 1/2" HD Disks 1.44 Meg (10) ..... 27.

## ★3M ... 60 day MBG

3943 DC2000 40 MB Data Cartridge. .... 20.

## ★MacConnection ... 60 day MBG

6592 44 Meg. Removable Cartridge .... 85.

## ACCESSORIES

### Apple Computer

1114 LaserWriter Plus Toner Cartridge. . . 99.  
1115 LaserWriter II Toner Cartridge .... 105.

### ★Avery ... 60 day MBG

4864 Disk Labels 3 1/2" (Qty. 250) ..... 13.  
5392 Disk Labels 3 1/2"-Laser (Qty. 630) . . 29.  
4865 Address Labels 3 1/2" x 1 5/16" (3750) 15.  
4811 Transparencies 8 1/2" x 11" (Qty. 50) 22.  
4807 Laser Labels 1" x 2 5/8" (Qty. 3000) . . 24.

### ★Basic Needs ... 60 day MBG

Dust Covers ..... call  
Hard Top Keyboards ..... each 15.  
6682 Hard Top ImageWriter II ..... 16.  
7413 Mac IIcx/ci Monitor Stand ..... 47.  
7417 MacMouse (cordless mouse) ..... 89.



## Farallon Computing ... 30 day MBG

5707 Timbuktu 3.1—Features a multiple window capability which allows a Mac to view and control other Macs on a network simultaneously. A great brainstorming tool. Ideal for business and teaching environments ... \$95.

## ★Computer Coverup ... 60 day MBG

1723 ImageWriter II Cover ..... \$8.  
1725 Mac SE Ext. Keyboard Cover set. . . 10.

## ★CoStar ... 30 day MBG

7453 The Organizer Jr. .... 69.  
6091 The Organizer. .... 199.

## Curtis Manufacturing

6733 GFP-3 (Glass Filter Plus-Mac Plus, SE) 65.

## ★Goldstein & Blair ... 30 day MBG

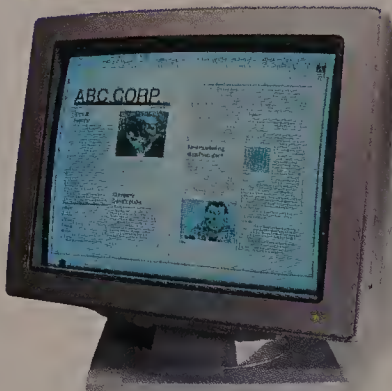
2267 The Macintosh Bible (3rd Edition) . . 19.

## ★I/O Design ... 30 day MBG

2379 MacLuggage Imageware II. .... 49.  
2376 MacLuggage Macinware Plus .... 59.  
2381 MacLuggage Macinware SE. .... 75.  
6129 The Ultimate SE/Ext. Carrying Case 79.  
Neon Ultimate SE/Ext. (available in pink, green, or yellow) ..... each 89.

## ★Kensington ... 30 day MBG

4643 Mac II Stand and Cable Kit ..... 64.  
2573 Tilt/Swivel (platinum) ..... 22.  
4973 Power Tree 20. .... 27.  
2559 Apple Security Kit. .... 33.  
2566 System Saver Mac (platinum) ..... 63.  
2567 System Saver Mac (beige) ..... 63.



## Nutmeg Systems ... 30 day MBG

Nutmeg 19—Monochrome two-page display for your Mac SE, SE/30, or II. ACrisp 72 dpi and 78 hz refresh rate make it ideal for DTP. Features platinum case and anti-glare screen coating. .... \$995.

2546 A-B Box (DIN-8) ..... 63.  
6763 SE Radiation/Anti-Glare Filter ..... 52.  
5064 Apple Color Monitor Polarizing Filter 63.  
PowerBackers ..... call

## ★MacConnection ... 60 day MBG

4623 Solid Oak Disk Case (holds 90 disks) 32.

## ★Mobius Technologies ... 60 day MBG

4470 Fanny Mac QT ..... 55.

## ★Moustrak ... 60 day MBG

2694 Moustrak Pad (standard 7" x 9") . . . 8.  
2692 Moustrak Pad (large 9" x 11"). .... 9.

## Ribbons

3255 ImageWriter II Ribbon Black ..... 4.  
3261 ImageWriter II Ribbon Multi-4-Color . 9.  
3270 ImageWriter II Rainbow 6-Pack. .... 20.  
3260 ImageWriter LQ Black Ribbon. .... 17.

## ★Sopris Softworks ... 60 day MBG

4019 Mac SE & Ext. Keyboard Cover (navy) 15.  
4017 ImageWriter II Cover (navy) ..... 11.  
4018 LaserWriter II Series Cover (navy) . . 17.  
4012 High Trek ImageWriter Carry Case . . 49.  
4013 High Trek Mac Plus Carry Case .... 59.  
4014 High Trek Mac SE & Ext. Kybd. Case 69.  
4862 SE Protection Pak (ext. keyboard) . . 75.



## Practical Peripherals ... 30 day MBG

3089 Mac Communications Pack 1.5—External 2400SA Modem, cable, and top-selling communications software. Hayes compatible, auto-answer. .... \$225.

## ★Targus ... 60 day MBG

3618 ImageWriter II Carry Case. .... 45.  
3617 Mac Plus/SE Carry Case. .... 55.  
4015 Mac SE & Ext. Kybd. Carry Case . . 69.

## ★Tripp Lite ... 30 day MBG

6200 Isobar 6 (surge suppressor, 6 outlets) . 59.

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Living in rural New Hampshire, we always felt that we had an appreciation for nature. But recently we, like many others, have started taking a long hard look at the impact of our activities on the environment. So we've stopped using foam peanuts to pack our

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definitely the last styrofoam peanut you'll ever see from us.

*Pat Gallup*

Pat Gallup, President  
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There are a lot of contenders—and pretenders—coming into the Macintosh market with so-called “full-featured” CAD programs. But there’s one program these imitators won’t compare to: MiniCad+. It set the standard for all Mac CAD programs when it was introduced in 1986, and continues to set the pace in Macintosh-aided design.

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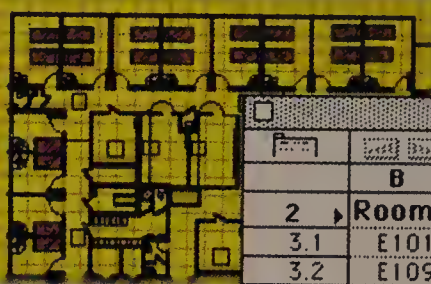
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Space Plan					
	B	C	D	E	F
2	Room	Area	Cost	Total	
3.1	E101	• 960.12	\$96	\$92184	
3.2	E109	• 512.56	\$51	\$26272	
3.3	E115	✓ 245.64	\$25	\$6034	
3.4	E111	• 469.26	\$47	\$22020	
3.5	E103	• 917.28	\$92	\$84141	

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# ART BEAT

by Cathy Abes

The tools and the talent behind Macworld's graphics and the techniques that make them possible

**Artist:** A silk-screen artist from upstate New York, Scott Baldwin began using the Mac when he started doing illustrations for *Macworld* four years ago. Because the silk-screening process of creating a separate screen for each color is similar to the way *Macworld* illustrations were done before the advent of the color Mac II, Baldwin was able to make an easy transition from traditional illustration methods to Mac-generated art.

**Tools:** Mac IIcx with 8MB of RAM and a 105MB Cirrus hard disk, a 12-by-12-inch Kurta graphics tablet, SuperMac ColorCard/24, SuperPaint 2.0, PixelPaint Professional.

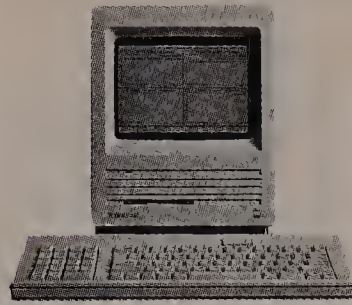
**How It Was Done:** For the illustration that opens our feature about navigating online services, Baldwin created a simple but appealing drawing with a textured background that evokes the feel of a woodcut. He began in SuperPaint by drawing a square the size of the finished illustration and filling it with black. Then with the 2-pixel-square brush, he drew (in white) the thin lines that define the various images in the illustration.

Once he had a finished black-and-white image, it was time to add color. So after saving the drawing in SuperPaint's PICT format, Baldwin opened the file in PixelPaint Professional. He chose two colors for each object or part of the drawing—such as the door, the background, and the man in the bathrobe. For example, for the man's face, he wanted a darker flesh (continues)



This is how the original black-and-white SuperPaint illustration looked after Baldwin imported it into PixelPaint Pro (left). Before pouring colors, he cut connecting lines to contain those colors in particular sections (right).

## Macintosh TO UNISYS MAINFRAME CONNECTIVITY



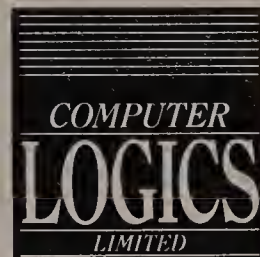
The Personal Emulation Package (PEP™) allows a Macintosh to emulate the entire family of UNISYS (Sperry) terminals (UVT112X and UTS 20, 30, and 40) for connectivity to Series 1100/2200 and System 80 mainframes. PEP features multi-session support, integrated printing, line monitor to disk, cut & paste, macro-key programming and a fully dynamic configuration. PEP supports both synchronous and asynchronous communication via multiplexers or modems.

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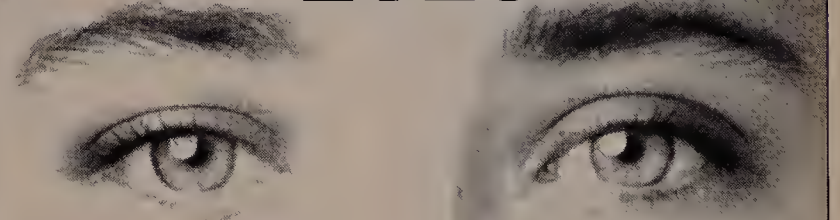


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After he cut the lines connecting the man's face to his hair, and his neck to his bathrobe, Baldwin poured in the dark flesh tone for the face (top left); next he poured the colors for the hair, the bathrobe, and the lines in the background (top right); and then the lighter flesh tone for the rest of the face (bottom left). This is how the man looks in the finished illustration (bottom right).

tone in the areas that had been black in the original drawing and a lighter flesh tone in all the white areas—the lines he had carved out with the brush in SuperPaint.

But because he didn't want to fill up the entire black area with the darker flesh tone, Baldwin had to first cut any lines that were connected to other lines or areas that were black, such as the man's hair. For this process, he used PixelPaint Pro's 2-pixel-square brush and the 1-pixel-wide pencil (for the smaller areas) with the dark flesh tone. Consequently, those unconnected areas remained unchanged when he later poured the dark flesh tone into the face. He repeated the line-cutting process with each part of the drawing. Finally, after making

all the cuts, he poured the colors one by one for each object, first pouring the darker color, then the lighter one.

Baldwin found the SuperMac 24-bit color board especially useful for the laborious line-cutting process. Because it creates a virtual screen of the entire screen, he could instantly zoom in to 200 percent. And by moving the mouse to the edge of the screen, Baldwin said, he could quickly pan the entire image at that same percentage. "It was like looking at the whole illustration through a magnifying glass."

Of the approximately ten hours Baldwin spent on the illustration, six to eight hours were devoted to the drawing in SuperPaint and the rest was spent on the colorization process. ■



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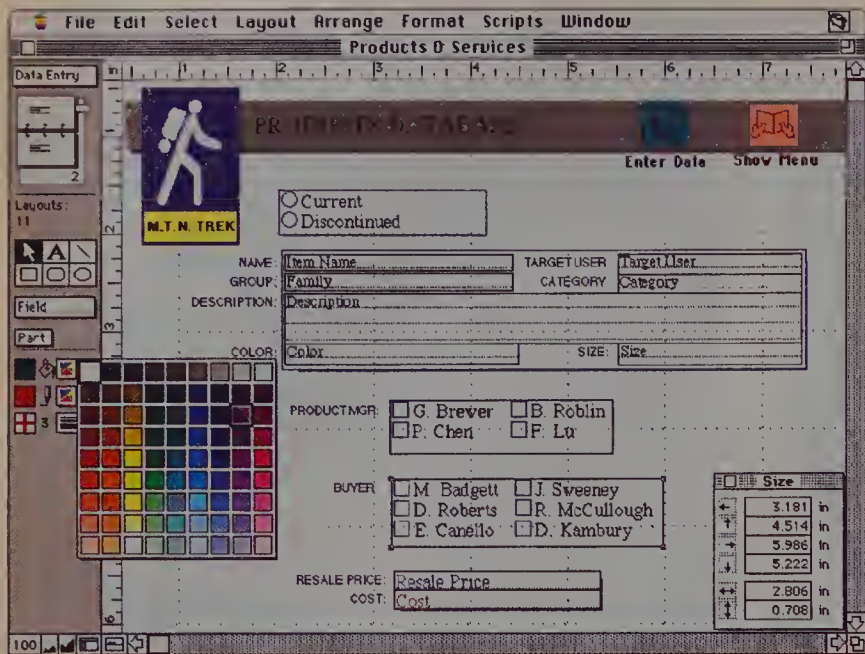
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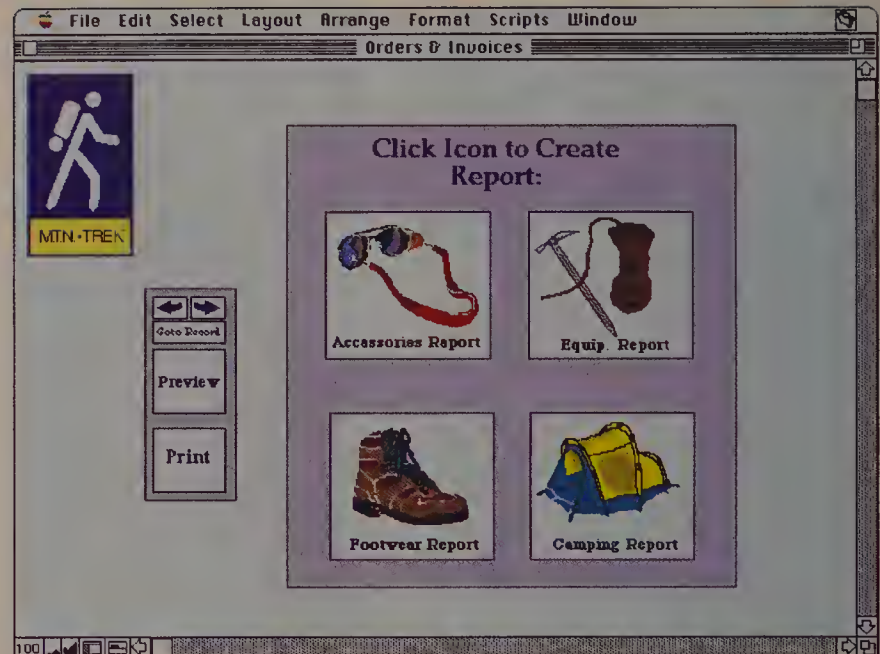
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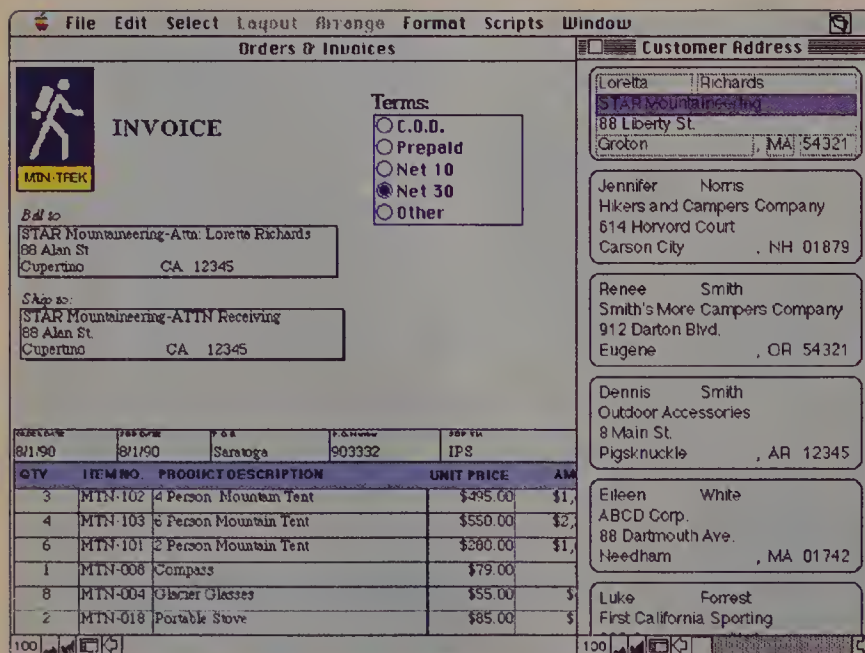
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

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		Clothes	\$4,842.60	
		Sports Equipment	\$5,690.00	
		Mountain Bikes	\$7,740.88	
		Season Total	\$21,038.48	
Spring		Camping	\$369.90	
		Clothes	\$5,351.76	
		Sports Equipment	\$39,083.31	
		Mountain Bikes	\$73,543.00	
		Season Total	\$118,347.97	
Summer		Camping	\$95.00	
		Clothes	\$10,339.12	
		Sports Equipment	\$950.00	
		Mountain Bikes	\$1,029.94	
		Season Total	\$12,414.06	
Winter		Camping	\$7,320.00	
		Clothes	\$2,720.00	
		Sports Equipment	\$5,015.36	
		Mountain Bikes	\$1,529.10	
		Season Total	\$16,584.46	
Total Sales		Camping	\$10,549.90	21%
\$168,384.97		Clothes	\$23,253.48	33%
		Sports Equipment	\$50,738.67	22%
		Mountain Bikes	\$83,842.92	24%



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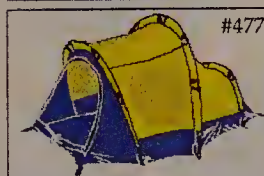
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# Code and Dagger

HAVE YOU FORGOTTEN ABOUT THE nuPROMETHEUS LEAGUE? THE FBI HASN'T.

BY STEVEN LEVY

One afternoon not too long ago, I was sitting in my office, at peace with the world, feeling like a solid citizen, when I received the first of two rather unsettling phone calls from Agent Joe Fallon of the Queens, New York, field office

of the Federal Bureau of Investigation. Agent Fallon began by insisting that he had spoken to me six months previously and that I had referred him to my lawyer. Now this is the sort of thing one tends to remember. But hey, I figured, maybe it was one of those amnesia things. So I asked him for my lawyer's name, hoping that might jog my memory.

Agent Fallon suddenly retreated from his assertion that we had previously spoken. Maybe, he offered, it was some other Steven Levy. But, by the way, could I tell him if I had any knowledge of the nuPrometheus group? Or was I in possession of any material stolen from Apple Computer? Or did I know of anyone who was?

Now of course I knew about nuPrometheus. After all, it's part of my job to keep track of the bizarre things that happen around Apple Computer, a place that would keep Ripley supplied with items for a month of Sundays. This particular outrage had occurred in spring, 1989. Unmarked computer disks were sent to various publications, including *MacWeek*, *Computer Currents*, and *InfoWorld*,



as well as to software entrepreneur Mitch Kapor and a scientist at MIT's Artificial Intelligence Lab. They were accompanied by a letter signed by "The nuPrometheus League (Software Artists for Information Dissemina-

tion)." The letter contained some blather about the league's intention of "seeing the genius of a few Apple employees benefit the entire world, not just dissipated by Apple Corporate through litigation and ill will." When these recipients opened the disk and saw that it indeed appeared to be Macintosh source code (it turned out to be Apple's Color Quick-Draw routines), they called Apple and sent the disks in. The theft quite understandably bent some minds in the boardrooms of Cupertino, since Apple's apparent corporate function is to jealously guard and shamelessly cash in on the innovations it made in the early eighties, most of them embodied in Mac source code.

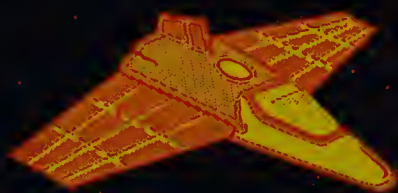
Not that I knew anything about who did it. I explained to Agent Fallon that I was merely a journalist and even spelled out the name of this magazine for him. (It seemed news to him that there were magazines for this sort of thing.) All I knew of the hard facts of nuPrometheus were things I read in the papers. His response was to repeat his questions to me, almost as if reading off a list. I wondered if this was a failure of *(continues)*

JEFFERY NEWBURY



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communication. I repeated my non-involvement, and I thought that was the end of it.

A scant two weeks later, however, Agent Fallon was back on the phone, wanting to know if I was ready to share further information. Maybe he figured I had cracked in the interim. In any case, I had no news. But I did have some questions for *him*. Like why he was calling me. "Somehow your name came up," he said, not fully satisfying my curiosity on that matter. Well then, why was the FBI so active now in pursuing the case, a year after the theft? According to Agent Fallon, this was a significant case of ITSP—Interstate Transportation of Stolen Property—and the FBI was extremely interested.

"I can equate this with a national secret," he said with some urgency. If a spy were to come by this code, Fallon explained, he might use it to *break into* the Apple Macintosh computer and steal the secrets within it. Well, I countered humbly, it doesn't exactly work that way. And I proceeded to explain a few things about how personal computers worked.

By this time I thought Agent Fallon and I were getting to be buddies. Unhappily, this camaraderie was cut short when he asked if I would supply him with my date of birth—I had the feeling that it wasn't to send me a greeting card. It was, he explained, to see if I had a criminal record.

Like I say, these were unsettling phone calls.

### Did Efrem Zimbalist, Jr., Start This Way?

In days to come I learned that I was far from the only unlikely source contacted by the bureau. It seems that around the country many others had had similar experiences. Among these was Mitch Kapor, one of the recipients of the code. He was interviewed a year ago. At that time, he was shown a list of names and asked if any of them were hackers. The session "had a surrealistic quality and was profoundly disturbing," Kapor recalls. "It seemed obvious to me they didn't have a clear sense of the technology—there was such a lack of understanding that the effort to investigate wouldn't bear fruit. They were lost in cyberspace."

(continues)



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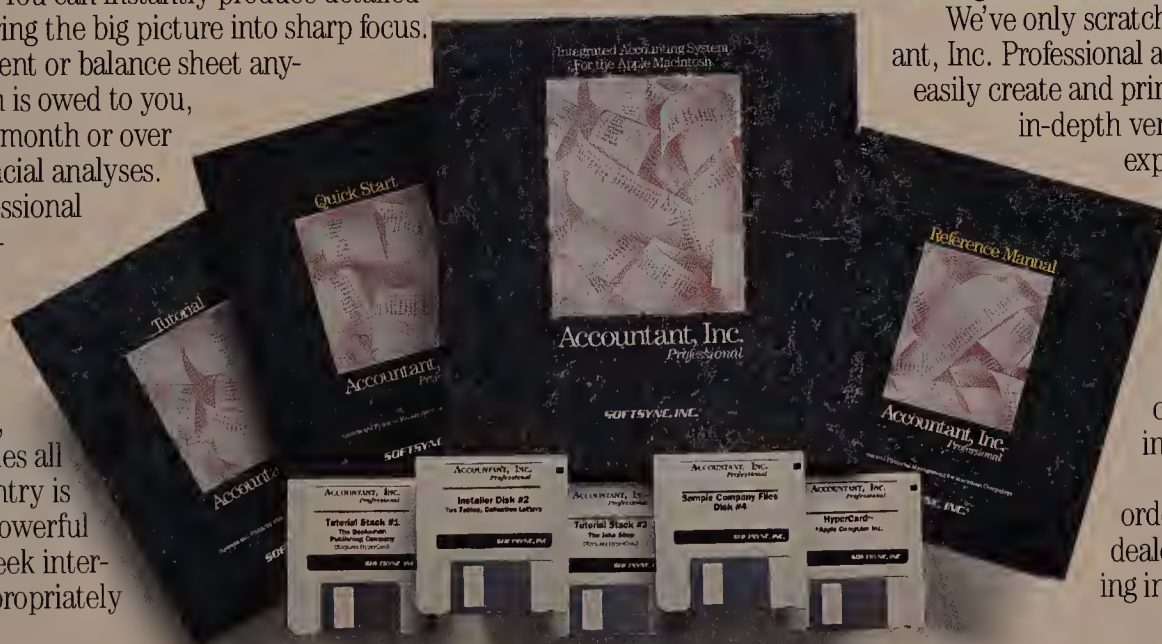
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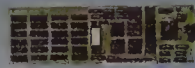
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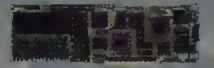




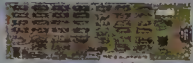
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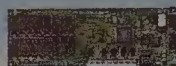
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More recently, around the time I was interviewed, John Perry Barlow, who writes about technology when he is not writing lyrics for the Grateful Dead, received a visit at his Pinedale, Wyoming, home from one Special Agent Baxter. "Agent Baxter didn't know a ROM chip from a Vise-grip when he arrived," wrote Barlow in an account he posted on the online service called the WELL, "so much of that time was spent trying to educate him on the nature of the thing which had been stolen. Or whether *stolen* was the right term for what had happened to it. After I showed him some actual source code, gave a demonstration of E-mail in action, and downloaded a file from the WELL, he took to rubbing his face with both hands, peering up over his fingertips and saying, 'It sure is something, isn't it? My eight-year-old knows more about these things than I do.'"

Barlow also reports that Agent Baxter told him some startling information—rather, misinformation—about the Hacker's Conference, a yearly meeting of wizard-level computer programmers instituted after the publication of my book *Hackers* in 1984. The FBI seemed convinced that this annual conclave provided a key to computer terrorism. It was not merely a spirited gathering of technology creators exchanging new ideas, as we thought, but, as Barlow quoted Baxter, a "gathering of computer outlaws with likely connections to, and almost certainly sympathy with, the nuPrometheus League." (Barlow also notes that Baxter consistently referred to the group as the New Prosthesis League.) In addition, the agent asserted that known hacker conference attendee John Draper (a notorious former phone phreaker known as Captain Crunch) was the CEO of the computer firm and Star Wars contractor Autodesk. (This would be news to Autodesk's John Walker, whose firm specializes in CAD software and not deadly laser beams. However, Walker, along with other potential shady characters like Nolan Bushnell, Stephen Wolfram, and science fiction writer Vernor Vinge, was at the most recent Hacker's Conference.)

It gets wilder. A former Apple programmer named Grady Ward says he

was told that the stolen code was now filtering back to Communist enemies of America through the Toshiba electronics company and also through John Draper. (For the record, there has been no evidence released linking this company or that man to the crime.) "It was an incredible story," says Ward. "It wouldn't even make a good novel. They said Draper was going to release the code and tip the international balance of power."

### The Nature of the Crime

Though Apple spokesperson Chris Escher says that the company is cooperating with the FBI (and that's literally all he will say about the case), apparently the cooperation does not extend to educating the FBI on the nature of what was stolen or even clueing the poor floundering agents in on the most rudimentary facts about personal computers.

Part of the problem seems to lie in the FBI's attitude toward the case. Agent Steven Cook, while refusing to comment directly on the progress of the case, put it succinctly: "This isn't a technology investigation—it's interstate theft."

That may be the legal charge, but the theft of source code involved in nuPrometheus is quite a different matter from hijacking a truck or robbing a bank. Software is a much trickier object than swag or money—it can move in elusive ways, and therefore access to protected software is a technically complicated matter. And the problem of the criminal's motive requires an even deeper understanding. In order to understand and ultimately apprehend the perpetrator, one must realize that this particular crime seems motivated not by greed or maliciousness, but by a peculiar attitude toward technology in general and the role of Apple Computer in particular. For instance, anyone familiar with the history of John Draper would realize that the nuPrometheus crime has nothing in common with Captain Crunch's phone phreaking. One has to feel some sympathy for the agents here—it's a terrible burden to have to solve this rather bizarre ideological crime without being steeped in the lore of Silicon Valley.

(continues)

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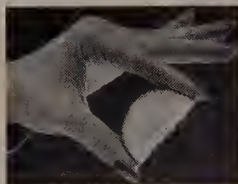


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### J'Accuse

Unfortunately, if the investigation is poorly handled, innocent people may suffer. So far the FBI has directly accused, though filed no charges against, at least three men. There seems to be no hard evidence against any of them. One was Chuck Farnham, the kind of guy Claude Rains might consider one of the “usual suspects.” Farnham is a gadfly who admittedly has handled confidential Apple information on occasion; he has even been known to inhabit garbage dumpsters in search of forbidden knowledge. “Someone in Los Angeles gave the FBI the names of three possible suspects,” Farnham told me, “and I was two of them.” But Farnham claims that he was not involved in nuPrometheus and further claims that at times during the previous year he acted as an unofficial consultant to the company on security matters. (No one at Apple would confirm this.)

### The Ward File

The second potential suspect, who also denies involvement, was the aforementioned former Apple employee Grady Ward. According to Ward's account, one morning FBI agent Steven Cook visited the 39-year-old engineer and said, “We know you did it.” The agent had a subpoena for Ward's fingerprints.

Why did they consider Ward a suspect? Because, they told him, he was judged the likeliest of five people at Apple who had requested access to the ROM code in the specific release that fell into nuPrometheus hands. The criteria for narrowing it to him? He had since left Apple, he had attended a progressive liberal-arts college, and he once formed an intellectual society called Cincinnatus, thus betraying the same fondness for antiquity shown by the name nuPrometheus.

Did he in fact sign out the source code? “It was true,” he says. “I checked the code out and shared it with our group. That was part of our job—anyone in [my manager's] organization had access and didn't need permission to see it.” How many people were in his group? “Hundreds,” he says. “The source code would go [throughout Apple] on the Internet network. (continues)



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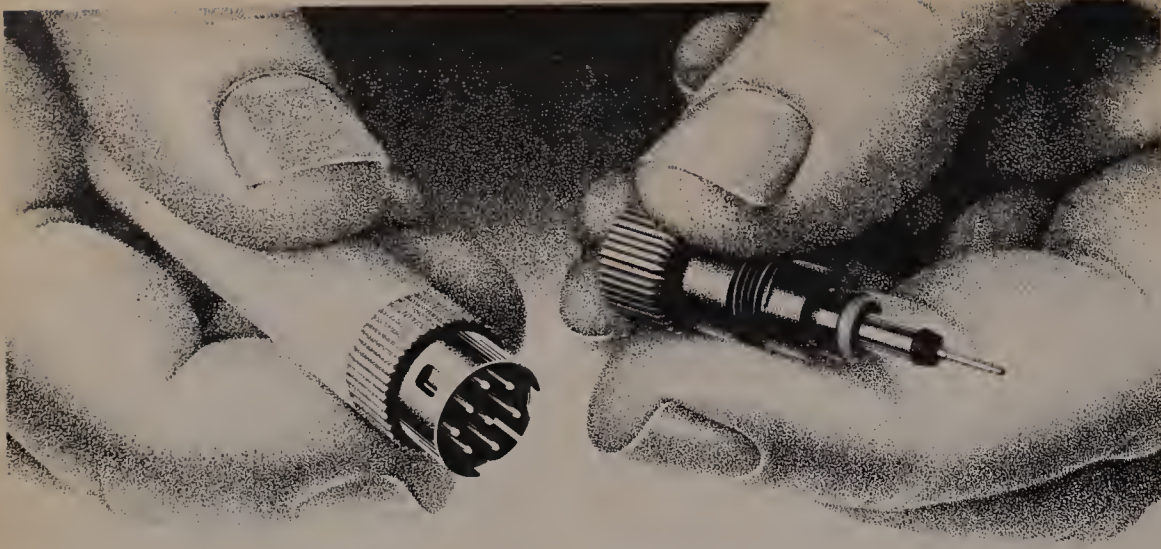
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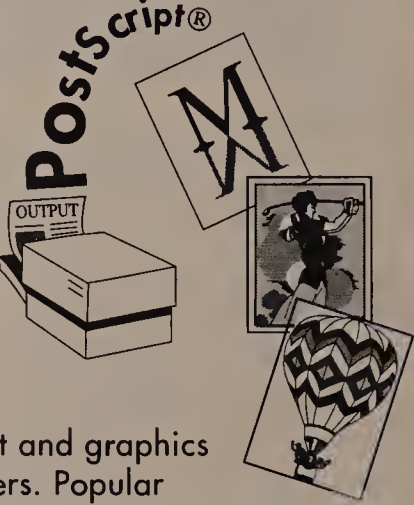


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People could browse through it. You could collect pieces, like trading stamps, and eventually get the entire operating system."

Another former Apple employee concurs that it was no trick for any Apple engineer to copy the so-called crown jewels. And why not? Only by knowing what the code was could people improve upon it. "It's like love," says Grady Ward. "The more you copy it the more you have." (Precisely the sort of tricky technological fact that the FBI is unlikely to grasp.)

In any case, Ward provided the fingerprints as required by law, and he hasn't heard from the FBI since.

### Member of the Party

The third person directly accused was Walter Horat, a programmer who says he was contracted to do a job at Apple soon after the nuPrometheus mailing. "Anyway, I had no access to engineering documents," he says, denying any involvement in the crime. This past April the FBI came to his cubicle at Apple to interview him (he was out sick) and then to his house two days later. They told him there was a witness who overheard him boasting at a party that he was involved in the case. Asked to take a polygraph test, Horat consulted a lawyer and declined the offer. Subsequently, he was fired from Apple "with no reason given," he says. Only afterward, reconstructing his conversations with others at the party, did he recall discussing the nuPrometheus case—but, he insists, only speculating about it, just as thousands of people do in gossip-driven Silicon Valley.

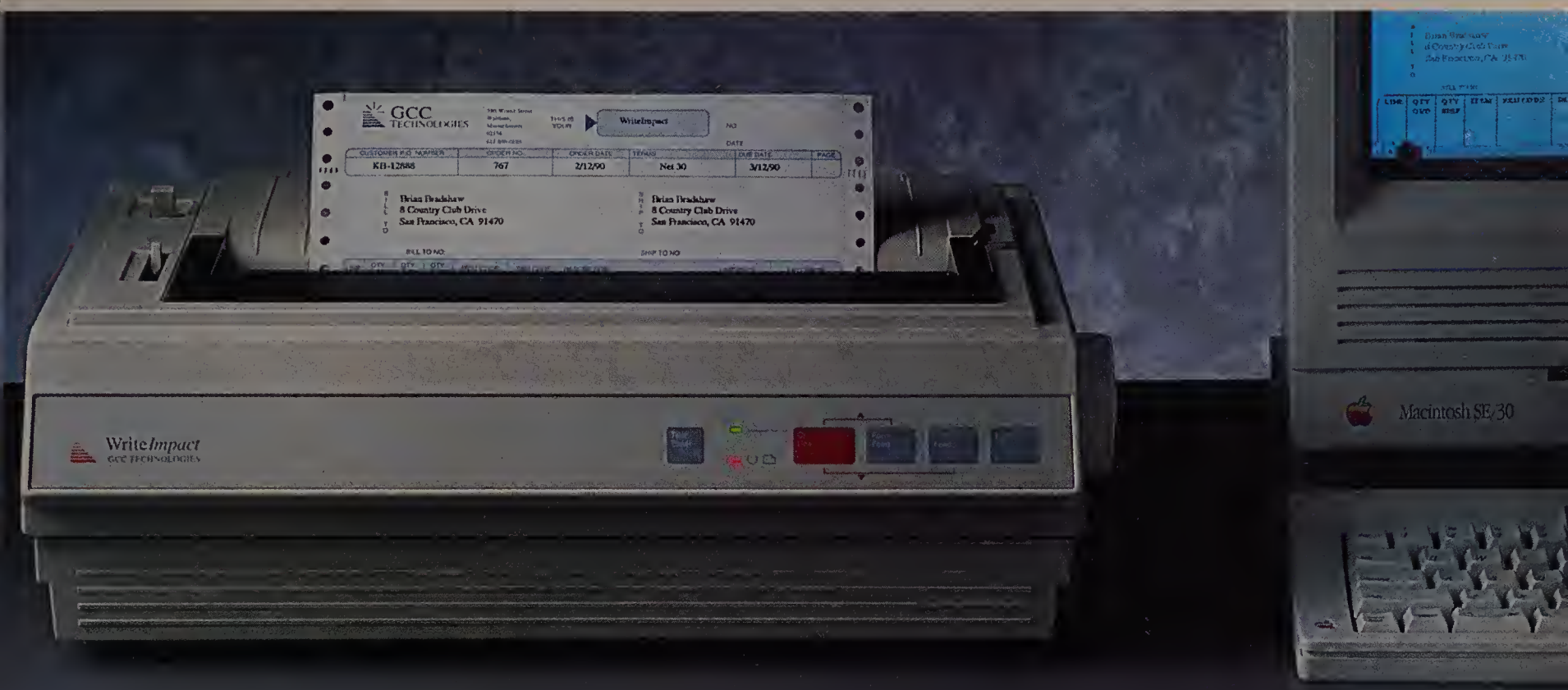
### Sorcerer's Apprentices

Questions persist in this case, and almost all of them are more perplexing than the identity of the criminal. First is the question of why the FBI has decided that chasing down this particular lawbreaker is more important than, say, using its resources to pursue the estimated thousands of white-collar thieves who sacked the savings-and-loan institutes and wound up costing taxpayers perhaps a trillion dollars. After all, Apple has managed to stay in business after the theft of the code and, despite the league's

(continues)



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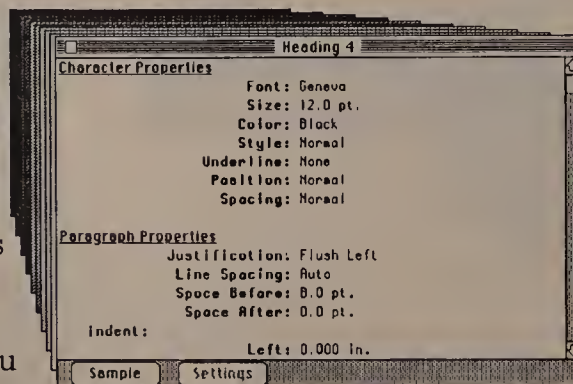
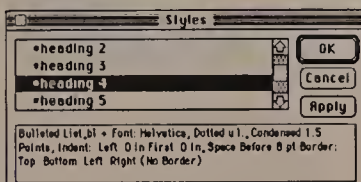
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promise to the contrary, no further nuPrometheus releases have appeared. Quite probably whoever perpetrated the stunt was intimidated by the unexpected zeal of the investigation and wisely decided to stuff the whole enterprise.

Most Silicon Valley observers believe that Apple, perhaps through its outside security firm Kroll Associates (which reportedly employs a number of former G-men), has pressured the FBI into pursuing the case. As put to me by former Apple security head Ken Moore, "Part of the function of a [corporate] security department is to enlist the aid of law enforcement. That's not easy to do. It's not just a matter of picking up the phone."

In any case, by encouraging the FBI to go all out on this matter, Apple seems to have unleashed a sorcerer's apprentice on the Macintosh community. The suspect count is rising. Computer writer Stephen Satchell told me that during his interrogatory with the FBI in Reno, Nevada, he managed a peek at an agent's list of potential interviewees and counted about 60, in 39 states; Agent Cook's noncommittal comment on this was "maybe even more." Cook quite properly notes that it is a logical standard procedure to conduct a thorough investigation, "looking wherever we can to get information." This extends, I guess, to interviewing people just because they attended the Hacker's Conference or, as other speculation has it, because they participated in discussion on the WELL conferencing system.

But at what point does the investigation snowball all out of proportion to the crime, which, after all, seemed less a greedy or malicious act than a futile, ultimately silly ideological burst of electronic terrorism? Perhaps the line is crossed when people have to be careful about what they say at parties—because federal agents or their informants might be listening.

Which leads us to a final question: when does an investigation become a witch-hunt? **M**

Steven Levy is a Macworld columnist and the author of *The Unicorn's Secret: Murder in the Age of Aquarius* (NAL, 1989).



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# Surveying the Shakeout

IS ANOTHER JASMINE IN THE WORKS?

BY DEBORAH BRANSCUM

**L**ike a pudgy guy in a too-tight suit, hard disk companies are pretending that everything is normal at the same time that they're being squeezed from all sides. Profit margins are down. Competition is up. And the overall market for

third-party drives is getting smaller as the percentage of drives installed at Mac factories increases. As a result, marginal companies are at risk now more than ever. And consumers who make the wrong choice may lose big.

When John Fambrough bought a hard drive from Crate Technology last year, all he wanted was a decent product at a decent price. But when Fambrough's dealer sent the drive back for repairs they discovered Crate's price apparently didn't cover service. The drive sat at Crate for months. Then the company went belly-up and filed for Chapter 7. At this writing Fambrough has been without his drive for nearly seven months.

Crate was an early casualty this year, but it probably won't be the last. "It's safe to predict that half of the companies that supply disk drives will be out of business in three years," says SuperMac Technology president Mike McConnell. "And you'd better figure out which ones."

Why the shakeout? Insiders cite two basic reasons. First, it's been fairly easy to go into the business, with manufacturers and magazines offering supplies and advertising on credit to start-ups. Some companies do well early on but then go under when times

get tough, because of their executives' poor business skills. president of GCC Technologies. "They think that because a lot of cash is coming in they must be making money, when in fact they're building up debts that are unpaid. And since they don't have good financial controls, these guys don't even know they're going in the hole."

The second reason for the shakeout is lower profit margins. Last spring at least six companies, including Apple, cut prices on their hard drives. And new players, such as distributor Mac-America, are joining the fray. Such cutthroat competition keeps prices down. But lower margins make it difficult "to provide the higher level of service that we want to provide and still make money at it," says Robert Jagitsch, president of Third Wave Computing, a small Apple value-added reseller in Austin, Texas. "There are a lot of competitors who make it hard to compete by cutting margins to the bone, offering inferior software, and offering what we consider to be poor levels of support. Unfortunately, the only way to prove to the customer that you provide good service is after you've made the sale."

According to SuperMac's McConnell, "It has become a commodity (continues)



Quantum employees maintain clean conditions as they assemble and package hard disk drives.

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One of the best things about microLaser is that you only buy what you need. Memory is upgradeable in 1MB increments up to a total of 4.5MB, and you can upgrade it yourself, without tools or technicians. All you have to do to get additional fonts is download through software or plug optional microCartridges

into two credit card-size slots.

## **Superior paper handling.**

Part of what makes microLaser a truly personal, desktop laser printer that takes up so little room is its paper drawer, which slides inside. Because microLaser holds 250 sheets standard (it holds 500 when

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POSTSCRIPT®

you add an optional paper drawer), you spend less time refilling paper and more time creating superb-looking documents.

This printer also handles a variety of paper sizes and types — from letter, legal, and executive to transparencies, labels and envelopes. For those times when you're facing a large mail merge task, just plug in an optional envelope feeder to alternate between letters and envelopes.

## **Your own PostScript printer is a call away.**

To find out more about how you can have affordable PostScript printing for your Macintosh, call today.

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the Adobe PostScript language, offers 35 PostScript typefaces, 1.5MB of memory and an AppleTalk® Interface.

If you also use MS-DOS® Computers, you can switch between the PostScript language and standard HP LaserJet® Series II emulation easily

  
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market in which customers are saying, with their checkbooks, I would prefer to pay a little less and get a little less. And they get away with it, usually, until their disk crashes and is in the shop for a month."

Many companies that sell drives are running scared these days, although they won't admit it. And the chief bogeyman who has them worried is Michael Ehman, president of Ehman. Ehman sells one line of drives direct and another, called Cutting Edge, through dealers. The company's glossy, attractive ads and low-cost drives have pulled in customers and bred dismay among competitors, who are careful not to mention Ehman by name when they discuss low-end companies.

Their line of reasoning goes something like this: we know how much it costs to build a drive and service and support it. There is no way companies like Ehman can make any money selling a 20MB external drive for \$299; at least there's no way they can build

organizations with strong service and support at those margins. Such companies may not be in financial trouble now, according to this argument, but they're shakeout candidates for the future.

Michael Ehman gets angry when he hears such talk and denies that his company can't live on its margins. "Our cost of goods is lower than our competitors', we believe, because we have economies of scale; because we have been at this for five years and are more efficient; and because we operate in Wyoming where we have a dramatic advantage in overhead," he says. Ehman owns its own factory and has employees who do much of the work other companies contract out. That's partly why he can charge lower prices, says Ehman. "My company really tries to make good stuff for as little money as we can and give it to the consumer for as little as we can and make a fair return. But it's not a Macintosh [market] return." Most Macintosh companies want a 40 percent return, Ehman

says; his company and his employees are willing to settle for smaller profits and lower paychecks.

The stability of a company is important when buying a product expected to last several years, but it isn't the only issue. Consumers must also weigh issues of quality, service and support, and price.

**Quality** Unless you're an expert, it's hard to judge the best drive. That's what *Macworld* tries to do in articles such as June's feature on midrange hard disk drives, which ranked drives based on our testing. So magazines are a good place to start, as are bulletin boards and user groups, to get a feel for the reputation of both the company and its drives.

Manufacturers Quantum and Conner get high marks for their mechanisms and so do high-end drives from Imprimis, which is now owned by Seagate. But the mechanism a drive uses is only one part of the equation. (continues)

*The continuing adventures of*

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THE HERO OF HAPPY MAC'ers

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- INITIALIZE
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3. TURN ON
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*"Order today, it's on your desk tomorrow."*

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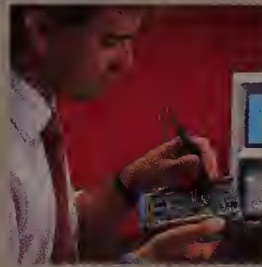
*"If I could choose from all three manufacturers . . . I'd prefer the Mirror"* — MacUser

Customers are using our RM42 removable drives everywhere and for everything:

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## We Repair The Competition's Drives



... and we've seen them all (Apple, Jasmine, SuperMac, GCC, PCPC, Ehman, and others). We've learned a lot about how (and how not) to build a hard drive. Most companies don't employ ESD static protection, pre-testing of sub assemblies, or utilize gold plated contacts. We do. So rest easy, your precious data is in good hands.

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45	367	447
60	—	547
80	—	597
80MP*	667	747
105MP*	717	797
200MP*	1117	1197
290MP*	—	1997
580MP*	—	2497

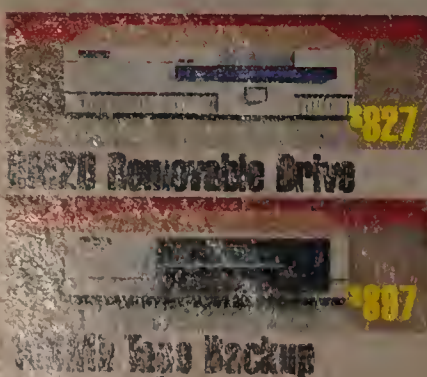
\* MP designates premium drive

While most companies sample test, we test every drive so the drive *you* receive is hand tested. It arrives pre-formatted, and loaded with 10Mb of software. Inside are the best and fastest components available (Quantum, Imprimis, Seagate), an international power supply, SCSI switching, fan, and cables.

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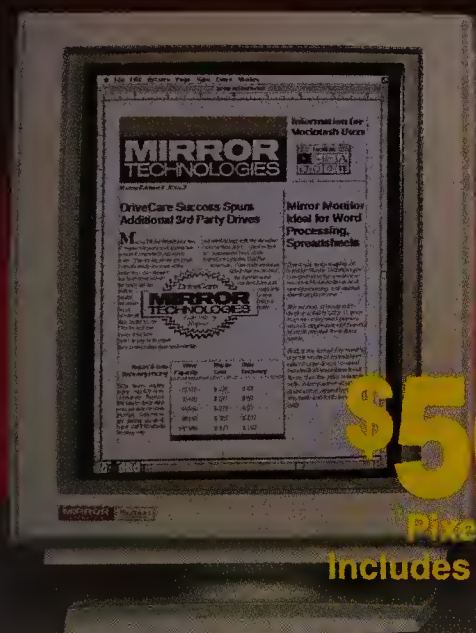
Here's what you get for \$697: Proven Syquest technology, full steel chassis, international power supply, convenience outlet, SCSI selection, RFI/EMI filtering, ultra-quiet fan, gold plated contacts, and all necessary cables. And it's backed with the longest supported warranty in the industry. It's everything you'd expect from a \$1,500 removable for \$697.

Remember, order today, it's on your desk tomorrow. ”





# PixelView II Display Removable Drive

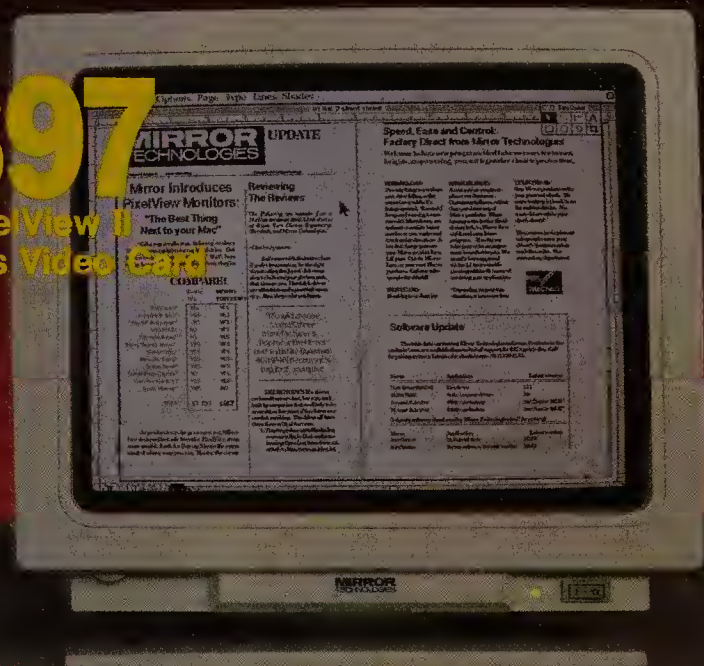


**\$567**

**PixelView I  
Includes Video Card**

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**PixelView II  
Includes Video Card**



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Ronald Eibensteiner, President/CEO

## “It Took Time To Build A \$1,700 Display System For \$897

We sourced tubes from the same folks as Apple. We chose the same phosphor. We tuned the system to 78hz vertical refresh rate to eliminate annoying flicker. And we built in enhancements like pop-up menus, sizable cursor and menu bar, screen saver, screen copy and more! With all this for \$897, what'll you do with the \$800 difference? (hint: check out our RM42)

## From Plus To Portable; We've Got You Covered

We have a PixelView I and II system for every Macintosh being made: Mac Plus, SE, SE30, Mac II, IIfx, IICx, IICi, IIfx, and portable. Each PixelView system comes with *everything you need*: monitor, card, cables, manual, and software!

## COMPARE!

19" Monitor	Radius	Mirror
Anti-glare	yes	<b>yes</b>
Both screens active	yes	<b>yes</b>
WYSIWYG	yes	<b>yes</b>
78hz vertical refresh rate	no	<b>yes</b>
Tear-off/Pop-up menus	yes	<b>yes</b>
Cursor sizing	yes	<b>yes</b>
Menu sizing	yes	<b>yes</b>
Screen saver	yes	<b>yes</b>
Screen copy*	no	<b>yes</b>
Full year warranty	yes	<b>yes</b>
Dealer Markup	yes	<b>no</b>
Street Price	<b>\$1,695</b>	<b>\$897</b>

(Best Street Price 4/1/90) \*Mac II, SE/30

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W006



Even those drives that use the same mechanisms can vary because of the type of software used, the quality of other drive components (such as the power supplies), and because the most demanding companies get the best drives. "If you were to divide our customer base into tiers, there are people in the top tier who place much different demands on us than do other tiers of customers," says David Brown, president of drive manufacturer Quantum Corporation. In practice that means disks rejected by companies with rigorous testing procedures are bought by someone else—and sold to consumers. Last year GCC found it needed to buy more drives than it had on order from Quantum, so the company turned to electronics distributors to make up the gap. "They were unusable as sold to us by the distributor," says GCC's Curran. The outdated products GCC bought had to be returned.

Some of these drives are just fine. Some of them are junk. "There's an enormous amount of crap on the

street in terms of hardware," says Brown. "It's dumped there—very low prices, older technology. And regardless of how you think of disk drives, it's amazing technology. It's got more technology than the computer has." Outdated drives are not the only problem. One exec told me a new product his company has not yet introduced is being advertised and sold by some mail-order companies, even though it doesn't yet have the ability to remap bad sectors correctly.

So ask a company about its testing procedures. How long is a unit burned in? What kind of testing is done? Some companies like GCC and SuperMac test all their incoming drives and reject those that don't meet their standards. Ehman, which used to rely primarily on the manufacturer to test its drives, is now testing all its products in-house as well. Microtech International, on the other hand, tests only a random sample of 25 percent of its drives, unless a problem is found.

You can ask companies what per-

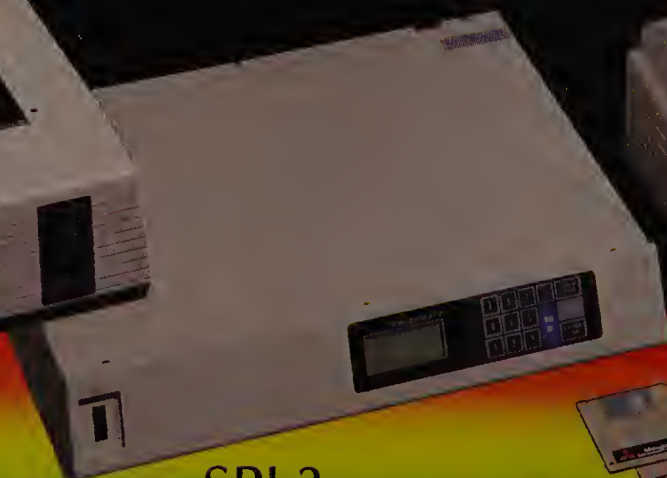
centage of drives they send back to the manufacturer and what the mean time between failure (MTBF) rates are for the drives themselves, but those figures are really only useful for comparison. Although vendors have been willing to tell me about past fiascos, I've never yet had one tell me its current failure rate for drives is more than 3 percent. And insiders confirm that MTBF rates can be pretty meaningless. "If someone puts out a flyer that says 200,000 hours of MTBF, it doesn't mean anything," says Brown. "When? At the 2 millionth unit? In ongoing reliability testing? Or in field testing, which is much more forgiving?"

**Service and Support** Because virtually every manufacturer has a bad run now and then, how a company responds to bad hard disks is even more important than how they prevent them. A lot of companies say they offer fast turnaround if a hard disk needs repair. Call up customer service and see if the representative ech-

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oes the sales department or has a different notion about repair times. Is there a backlog now? For how long? Is there a difference between service under warranty and service after warranty? (One *Macworld* reader is steamed because a company assured him that if his drive was under warranty it would be repaired in 48 hours. Trouble is, the drive is more than two years old, so the company is dragging its feet in fixing it.)

More questions to ask: Does the company have dealers trained to repair the drives themselves, or do all drives get shipped back to the manufacturer for repair? How expensive are repairs after the warranty period is over? Is there a loaner program if something goes wrong? Who pays for shipping, and how is the hard disk shipped? Try calling the tech-support department. How fast do you get through? Another issue is product availability. Will the company let you know if shipment is delayed?

"We tell people 7 to 14 days. And

we're usually right on," says Joel Kamerman, president of La Cie. But if that estimate is wrong, La Cie doesn't normally call customers to offer an updated shipping schedule. And if the calls I get from readers are a fair indication, neither do other companies.

The age and size of a company may help you get a feel for its condition, but they offer no guarantee. Plenty of old and large companies have failed. If you're buying direct, does the company encourage you to send in a cashier's or a personal check? Steer clear of companies that don't accept credit cards, and never pay with a check. Will the card be charged when you order, or when the hard disk is shipped?

I asked several industry executives to tell me what hard disk they would buy if their companies didn't exist. Cliff Wildes, president of Microtech International, recommends Everex Systems because of the company's technical support. SuperMac's McConnell says, "Probably the safest internal drive is

Apple's because it's installed on the factory floor. Not the best choice, but the safest choice." Quantum's Brown agrees. "I would only buy one from Apple or companies that have rigorous testing and sampling procedures. If you had a Mercedes, would you go down to Grand Auto to put a generator in it?" GCC's Curran said he would look at Everex and Storage Dimensions, which was also mentioned by another executive. Another insider said he likes drives from GCC and Microtech. And SuperMac was mentioned by still another source.

There are probably scores of companies in the storage business, so narrow your choices before you start calling for answers. Or find a good dealer who will do much of that work for you, suggests Ken Krich, vice president of operations at ComputerWare, a Macintosh-only chain in northern California. "ComputerWare, for example, was a major Jasmine dealer, but ended its relationship with Jasmine (continues)

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# The *Easiest* and *Least Expensive* Solution to Macintosh Training

Does your company waste money on Macintosh computers and software? Would it surprise you to know that 60% of all new software purchased is abandoned within 3 weeks! This is according to a recent survey in *PC Magazine*. Statistics show that hundreds of thousands of dollars are wasted by companies and by individuals who purchase software programs that are never used.

## Under-Used Computers and Programs

The survey only mentioned programs that have been put away on the shelf. It didn't add in the staggering number of computer users who use *only ten to fifteen percent of their program's capabilities*.

Think of the price of today's Macintosh software. It isn't cheap! A good example is the new PageMaker 4.0 which sells for nearly \$800. If you've purchased at least one of the leading word processing, database, spreadsheet, graphics, desktop publishing, and communication software packages you've invested thousands of dollars. Not to mention the cost of your computer(s), printers, hard drives, etc. Is this money wasted? Only if your Macintosh is half used, if your programs have been stuck on the shelf, or if the user is not 100% trained on the computer and your business programs.

## An Expensive Irony

Right now thousands of individuals and companies are thinking about upgrading their hardware. They're going to invest in faster, more powerful, and more expensive machinery. They're also planning on spending thousands more on software upgrades and new software purchases. Ironically, few are budgeting equal amounts of money for training. *The simple truth is that training is the best investment you can make.* New equipment can increase productivity by micro-seconds. *Training* can increase productivity by days and weeks.

## Training Options

Today there are many training options available. MacAcademy was the first to nationally offer both live workshops and video training. MacAcademy has specialized in Macintosh training for the past four years and has trained over 50,000 Macintosh users. Our experience has shown that VIDEO TRAINING is the most effective, fastest, and least expensive training option available.

## Why Video Training?

**Speed Learning:** The Macintosh is a graphics based machine. It thinks and operates through the use of pictures. Unlike the IBM which is character and keyboard based, the Macintosh is a visual machine, the emphasis is

the screen. The best way to learn the Macintosh is by *seeing* each technique taught on the actual Macintosh screen. A MacAcademy Video shows you step-by-step each Macintosh technique. Each software technique is clearly and visually taught to the new user.

**Flexibility:** Videos can be used by individuals or shown to entire companies. Videos can be checked out and taken home by new employees. Videos can be fast forwarded and rewound to review key techniques. Videos are easy. Studies have shown that many Macintosh users are lazy. Training programs that take a great deal of individual time and effort end up sitting right next to the abandoned software. People already are used to watching videos. MacAcademy videos are usually used within the first two days!

**Quality:** There are other video training programs out there. Most of them are only 45 minutes to an hour. Nearly all MacAcademy training videos run a full two hours. Each trainer featured on MacAcademy videos is our highest rated instructor from the two-day live MacAcademy workshops featured in over 100 cities throughout the U.S. They're not actors or software sales people. They are business executives who have been chosen from hundreds of applicants due to their excellent teaching skills, their thorough knowledge of the program, and their hands-on business background using the featured program. MacAcademy instructors are unmatched in the industry.

**Selection:** A few other companies offer three or four training videos. *MacAcademy now offers over 40 different Macintosh training videos* (see next page for complete selection). For the Mac and for most programs you will find a video training tape for beginners, for intermediates, and for more advanced users.

**Price:** Each video is only \$49. Again, if you pay hundreds of dollars for the program and thousands of dollars for the computer, \$49 worth of training will make that original investment much more valuable.

**Guarantee:** MacAcademy is the most trusted name in Macintosh training. Over 10,000 companies currently rely on MacAcademy video training. We invite you to invest in the most effective and valuable Macintosh training available. *If, for any reason for a full 30 days after receiving your Video Training Tapes, you are not totally satisfied, simply return the tapes for a full refund.*

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Advanced Mac	FileMaker Pro (Part 3)	Word 4.0 (Part 1)	QuarkXPress (Part 3)
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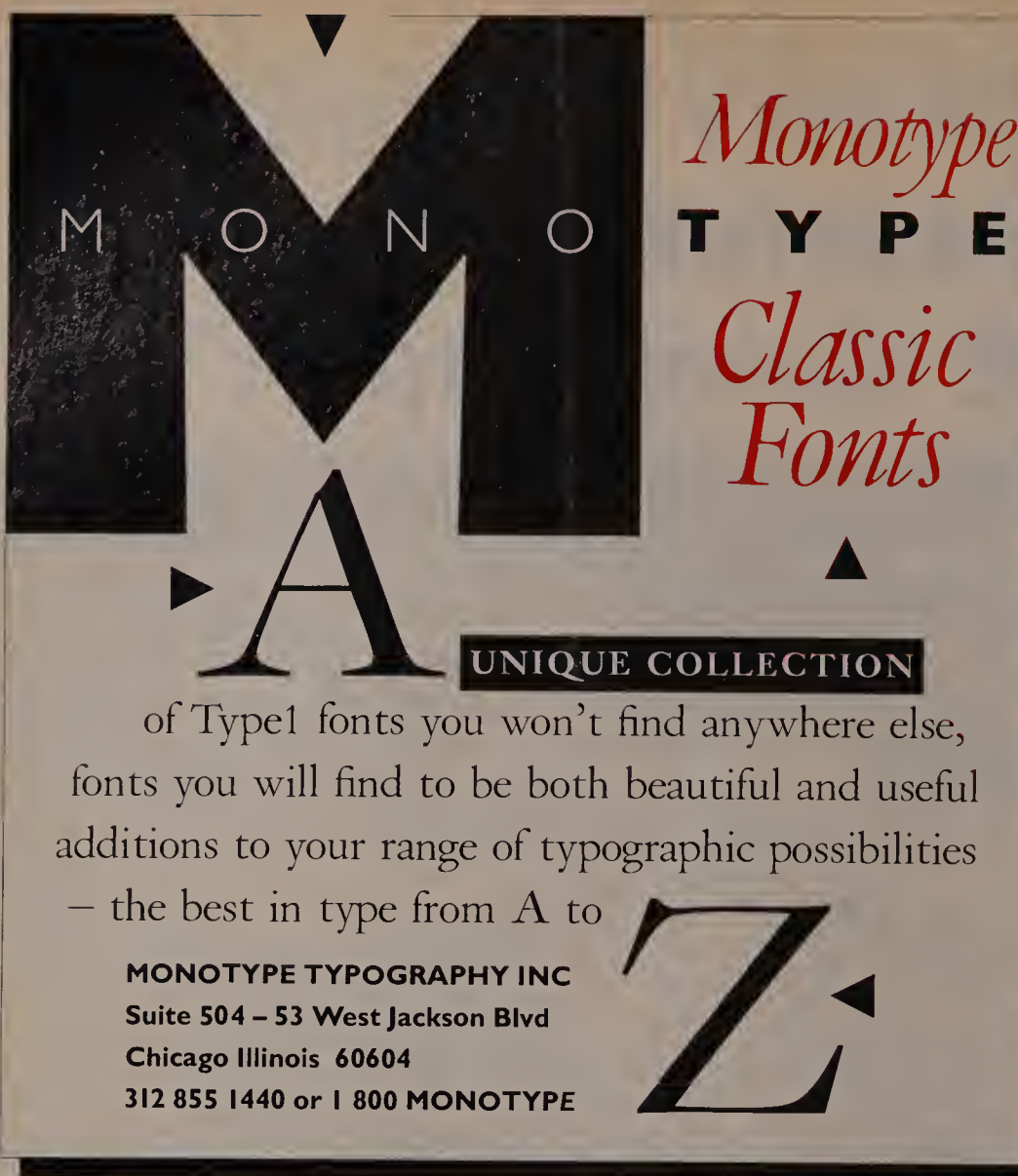
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## SERVICE HERO

**K**eith Howells of Louisville, Kentucky, writes in praise of Paul Mandel, co-owner of Alliance Peripheral Systems. After Howells bought an Alliance 105MB hard disk, he had problems with reformatting. One Friday night at 7 p.m., he left a message for Mandel on CompuServe. By 9 p.m. Mandel had responded with several suggestions and a phone number. Still having problems, Howells called a couple of times on Saturday and was taken through a series of steps until the glitch was found and resolved. "I'd say that his fast response via E-mail and his willingness to support his product over the weekend are certainly worthy of mention," writes Howells.

nine months before Jasmine filed for bankruptcy because of problems with the company."

Krich says his company checks for speed, quality of construction, and features when deciding what drives to carry. The features he looks for include software quality and, for external drives, external SCSI connection, external termination, autoswitching power supplies (so you can plug it into either 110- or 220-volt power), and an LED light.

"Not every drive has all these features, but these are the things we look for," Krich says. ComputerWare also visits the company that makes the drives, talks to the tech-support people, and examines their testing procedures. "And we also try to review, as best we can, the financial status of the company. Because many of the companies in the hard drive business are very small and undercapitalized and we don't want to take a risk that a company we deal with won't be around to fulfill its warranty."

But what if you don't want to go through a dealer? "There are good drives available through direct distribution. We sell two of them—*(continues)*





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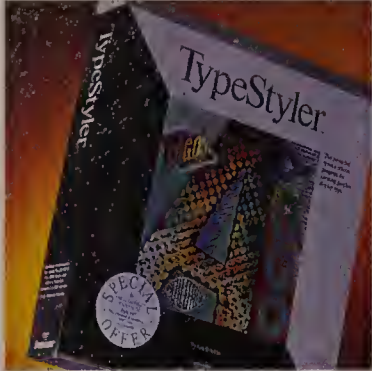
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**TimeSlips Corporation**  
TimeSlips III .....168.

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AEC Information Mgr .....408.  
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Reports 1.2 .....68.

**Micro Planning Software**  
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Works 2.0b .....177.

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**Preferred Publishers**  
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Expressionist 2.03 .....78.  
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**Presentation Electronics**  
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**ProVUE**  
Panorama 1.5 .....247.

**Satori**  
Bulk Mailer Plus .....178.

**Strategic Mapping, Inc**  
Exstatix 1.2 .....218.  
MapMaker 4.0 .....288.

**Softstream**  
Authenticate & Mutate .....83.  
Endeavor Planner .....96.

**Symantec**  
MORE 3.0 .....264.

**Symmetry**  
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Key Plan .....242.

**Synex**  
MacEnvelope 5.0 .....53.  
MacEnvelope Plus 2.0 .....184.

**Tree Star**  
FlexiGraphs .....123.

**Vertical Solutions**  
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FastEnvelope .....48.  
FastLabel .....83.

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Sticky Business .....88.

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**Lifetree**  
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**Microsoft**  
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**Paragon Concepts, Inc**  
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**Tactic**  
Clairvoyant .....50.

**T/Maker**  
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**WordPerfect Corp.**  
WordPerfect 1.0.3 .....228.

**Working Software**  
QuickLetter .....71.

**Xerox (Datacopy)**  
AccuText .....439.

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Illustrator 88 .....274.  
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True Form .....223.  
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Type Align .....57.  
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Collector's Edition II .....128.  
Publisher's Pack I .....228.  
II & III .....ea 278.

**Aldus**  
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PageMaker 4.0 .....499.  
PageMaker Color Ext. ....134.

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Art Importer 2.0 .....88.  
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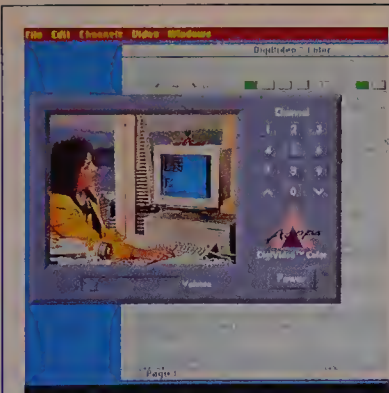
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**CE Software**

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**Claris**

MacPaint 2.0 .....92.  
SmartForm Designer.....294.

**Creative Software**

Easy Color Paint .....42.

**Deneba Software**

Canvas 2.1 .....188.  
UltraPaint .....123.

**Electronic Arts**

Studio/1 .....94.  
Studio/8 .....294.  
Thunder II.....48.

**Foundation Publishing**

Comic Strip Factory .....37.  
#1 Office Days .....20.  
#2 Kid Stuff .....20.

**Image Club**

Evolution .....64.

**Letraset**

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\*DesignStudio.....495.  
\*FontStudio.....359.  
ImageStudio.....149.  
\*LetraStudio.....259.  
ReadySetGol 4.5 .....179.

**MacroMind**

MacroMind Accelerator .....124.  
MacroMind Director.....438.

**Mainstay**

Capture 2.0 .....48.

**MicroFrontier**

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**Pantone**

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**Paracomp**

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ModelShop.....364.  
Swivel 3D 1.1 .....294.

**Postcraft**

Laser FX .....47.

**Preferred Publishers**

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**Quark**

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QuarkExtras .....53.  
QuarkStyle .....159.

**Sabastian Software**

Image Grabber 2.0.....31.

**Silicon Beach Software**

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Personal Press.....199.  
Super 3D 2.1.....313.  
SuperPaint 2.0 .....124.

**Softstream**

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**Solutions**

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**SuperMac Software**

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PixelPaint Pro .....388.

**Synergy Software**

KaleidaGraph 2.0.....144.

**Tactic Software**

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**Timeworks**

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**U.S. Micro Labs**

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**Zedcor Inc**

DeskPaint/DeskDraw 3.0 .....114.

**Fonts & Clip Art**

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**Adobe PostScript Fonts**

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67 ITC Clearface.....243.  
68 Americana .....123.  
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70 Century Expanded .....93.  
71 Serifa.....178.  
72 Caslon Open Face .....61.  
73 Frutiger.....235.  
74 Linotype Centennial.....239.  
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76 Weiss .....123.  
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78 Univ News, Commercial Pi  
Univ Greek & Math Pi .....93.  
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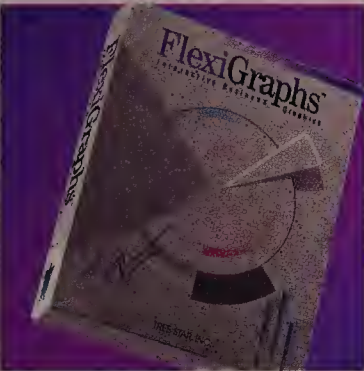
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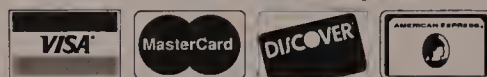


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Microtech and GCC," Krich says. "The problem for the buyer is identifying which companies in the direct channel are good solid companies."

La Cie sells drives both direct and through dealers. While insisting that La Cie offers good service (such as replacing bad drives with larger capacity ones to speed repairs), Kamerman says that local support and long-distance support are not the same. "Users think they should get the same service from mail order as from dealers," he says. "They don't understand there's a difference."

Kamerman's honesty may lose him a few fans, but it shouldn't be surprising that local service and support may differ from what you get when buying direct. Some people are willing to pay for the difference; others argue that there is no difference. The difficult task for consumers is balancing price, quality, and support issues to choose the hard disk that's right for them.

#### Jasmine, Crate, Heart Data News

As of this writing, Jasmine expects the bankruptcy court to approve its reorganization, which gives French company Chess SA 70 percent ownership of Jasmine, with creditors owning the remaining 30 percent. Jasmine says the Chess investment will speed repair turnaround and product fulfillment for customers forced to wait for months while the company got its financial affairs in order.

Meanwhile, Microtech International has expanded its offer on Jasmine drive warranties. The company will honor warranties on hard disks with mechanisms from Quantum, Micropolis, and Toshiba. (Remember, opening a drive voids the warranty, so use SCSI Probe Software, available from many user groups, to pinpoint the drive's manufacturer.) Call 800/626-4276 for details on the program.

Racet, which manufactured many of Jasmine's high-end DirectOptical disc drives, DirecTape drives, and multiple-drive subsystems, announced that it will honor warranties on those products. Call 714/579-1725 for info.

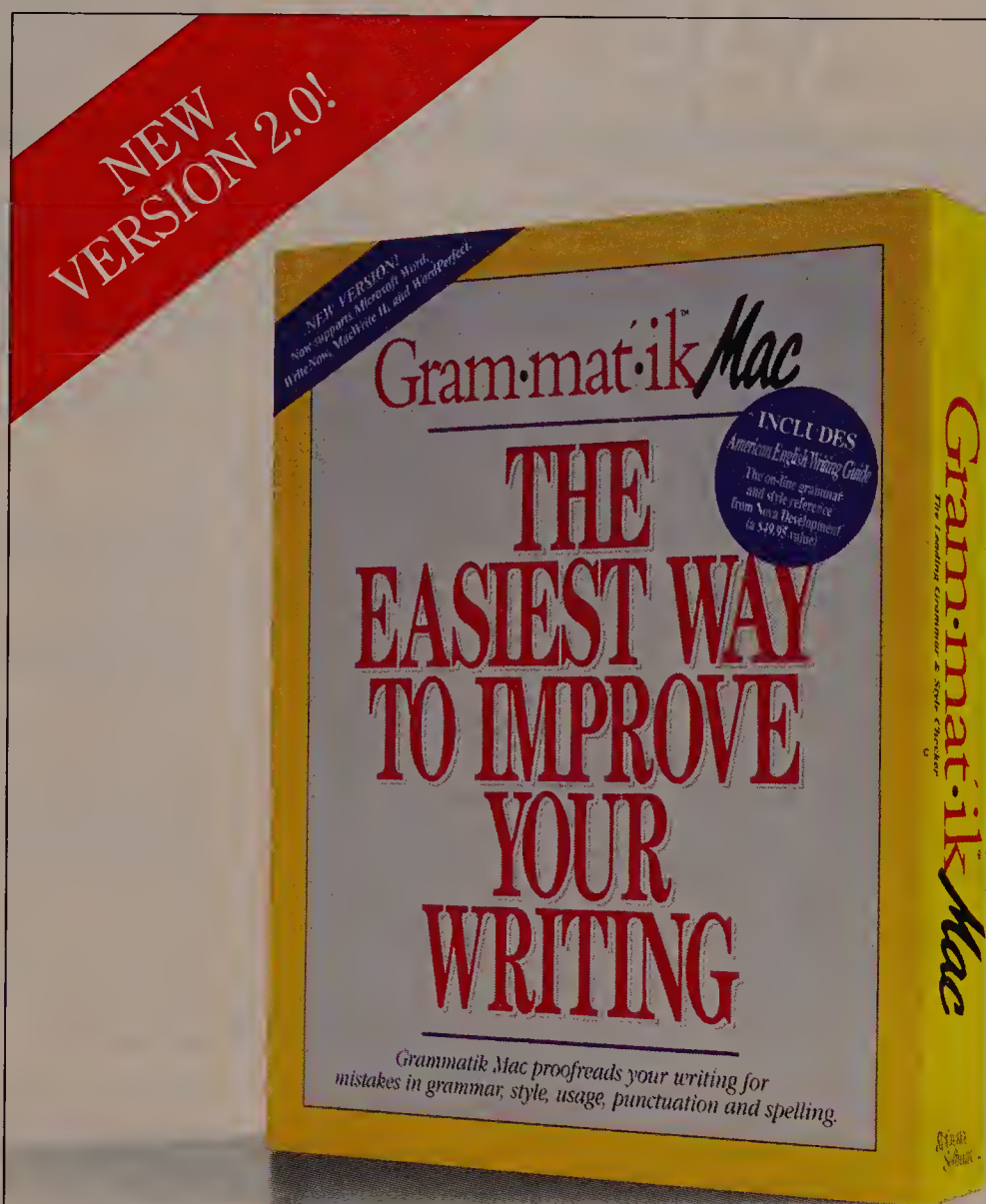
Crate Technology president Chris Lemoine says that investors have formed Data Storage Development to buy the assets of the old Crate Technology and relaunch the business with

the same name. Crate's telephone number, 818/766-4001, is back in service and Lemoine says the new company will honor the old warranties.

Heart Data Corporation closed its doors in mid-June, according to Data Enhancements of Westlake Village, California. Data Enhancements president David Barton said his company is manufacturing Heart Data's hard

disk drive products and honoring its warranties. You can reach Data Enhancements at 818/879-2700. ■

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# Paying the Piper

SYSTEM 7.0 PROMISES BETTER COMMUNICATIONS BETWEEN APPLICATIONS—BUT AT A PRICE

W

BY BRUCE F. WEBSTER

With the release of System 7.0 (probably early in 1991), Apple will offer its first major advance in interapplication communications (IAC) in seven years. The advance is long overdue, especially in light of competing developments from

Microsoft, Hewlett-Packard, and Next. In theory, the benefits will be great: applications will be able to send requests to one another, return status information, and, perhaps most importantly, exchange data.

But there is a catch. Support for publish and subscribe, AppleEvents, and other IAC features will not magically appear in applications running under System 7.0—they will have to be added. All this is not to fault Apple for the introduction of IAC in System 7.0. But to implement IAC capabilities, software companies must develop new versions of their applications, new versions compatible with other applications. This also means that to take advantage of IAC, Macintosh users will need to upgrade all of their applications.

No one knows how long it will take until all the applications and utilities we use will be available with support for IAC. And we don't know how well they will work together. Or how much we'll end up paying for all those upgrades. Moreover, it's not even clear exactly what additional features System 7.0 will have, because Apple is still working on it.

Apple gave more details about System 7.0 at its Worldwide Developers' Conference in May. As it stands now, the proposed IAC facilities in System 7.0 will work on three levels:

- dynamic data interchange (the pub-

lish-and-subscribe concept controlled by the Edition Manager);

- high-level events (such as AppleEvents); and
- low-level communications (data transfer via virtual ports).

Let's look at how each major IAC function works and what issues might arise in implementing them.

## The Edition Manager

System 7.0 will introduce a so-called live version of copy and paste. The new functions are called publish and subscribe, respectively, and they will be controlled by a new portion of the operating system known as the Edition Manager.

The basic idea is simple: you open a document within an application; select the data (text, and so forth) that you want to publish, and then choose Publish from the Edit menu. A dialog box will appear, allowing you to save the published selection with a given name and in a given location; the file created will be called an edition. A border will appear around the published selection, to indicate that it's a publisher.

To use that edition in another document (which may be created using another application), you will choose the insertion point—just as if you were going to paste—then select the Subscribe command from the Edit menu. Again, a dialog box will appear,



allowing you to locate the desired edition. Then the data in the edition will be inserted in your text with a border around it, marking it as a subscriber.

From that point, each time you save the original document, the application will write to disk any changes made to the publisher in the corresponding edition file. Likewise, each time an application opens a document subscribing to that edition, the application will read in the updated edition. Also, you will have the option to disable automatic updates for a given publisher or subscriber. A given edition will be able to have multiple subscribers (or publishers).

For example, with this facility you could—in theory—create a diagram in MacDraw II, publish it, then subscribe to that edition from within documents created by Word and Persuasion. *In theory* is the key phrase here. That's because Claris, Microsoft, and Aldus will first have to write (and release) new versions of these applications designed to work with the Edition Manager (and System 7.0), and you'll have to upgrade to those new versions. *(continues)*





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Generally speaking, all the applications involved must implement publish-and-subscribe functions for this process to work. Still, you will be able to subscribe to nonedition files, which means that sometimes you'll be able to get by with the publish-and-subscribe functions in your destination application only.

The publish-and-subscribe mechanism will work over AppleTalk, so that if you're on a network you'll be able to publish editions on your system and another person on the network will be able to subscribe to them (and vice versa). This is an advance in work-group publishing over AppleTalk, ideally allowing several individuals to work easily on different portions of the same single document. Each contributor could publish the elements (text, figures, graphs) that he or she is responsible for; the group coordinator would lay out the document and subscribe to all the required editions.

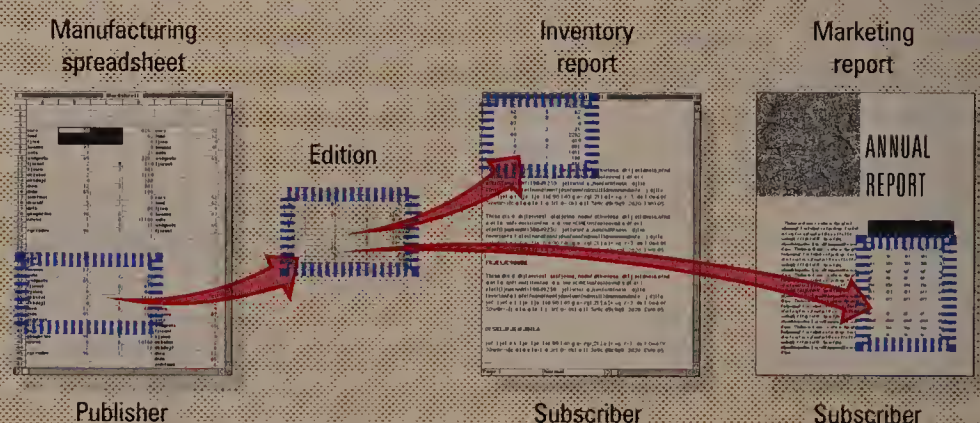
Some issues remain unclear. For example, what will happen if you have a publish-and-subscribe chain with multiple links? Case in point: You have numbers in a spreadsheet that you publish to an edition (which we'll call

Sales). You have a charting program that subscribes to Sales, using those numbers to create a bar graph, which it then publishes to the edition SalesGraph. Finally, you have a word processing document that subscribes to SalesGraph. So far, so good. Now, you go back into your spreadsheet and modify some of the published cells, which your application then copies to Sales. Finally, you open your word processing document—which still has the SalesGraph chart based on the old spreadsheet values. According to current documentation, that chart (and SalesGraph itself) will remain outdated until and unless you open the chart document, which will then import the updated version of Sales and export a corresponding version of SalesGraph.

It was that issue, among others, that led ACIUS (maker of 4th Dimension) to implement its own hot link manager (HLM). ACIUS says the company's HLM kernel keeps track of all dependencies and can handle multi-link chains automatically, updating all editions along a chain. However well-intentioned such efforts are, though, they are limited to related applica-

(continues)

## HOW PUBLISH AND SUBSCRIBE WORKS



The publish-and-subscribe functions of System 7.0 will let you open a document within an application, select the data that you want to publish, and then choose the Publish command from the Edit menu. The file created will be called an edition.

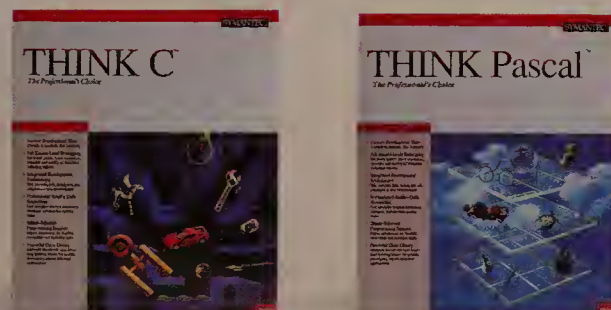
A spreadsheet could be a publisher, for example, with manufacturing data subscribed to by both an inventory report that is a word processing document and a marketing report in a page-layout program. As numbers in the spreadsheet changed, the inventory report figures would change too, once the document was opened. The marketing report would also be updated once it was opened.



# What Created



# Think.



All the Macintosh® applications above were developed in THINK C® or THINK Pascal®. Could it be coincidence? Think.

**SYMANTEC.**



tions—a dead end when compared with Apple's approach (assuming everyone jumps on the IAC bandwagon).

### AppleEvents

From the start, Mac programs have been event driven, that is, they respond to events (mouse clicks, key presses, and so on) generated by the user or by the operating system. Sys-

tem 7.0 will introduce a new category of events called AppleEvents. This category will allow applications to send events to one another, typically to request services, respond to a request, or notify of a condition. But with the new events will come new headaches and concerns for developers.

Apple proposes three classes of AppleEvents. The first class, standard

AppleEvents, will represent messages from the operating system. For example, the Edition Manager will send an AppleEvent to an application to inform it that an edition to which it subscribes has been updated; the application will then be responsible for reading in the new edition. (Note: an application must detect and respond to all standard AppleEvents to comply with System 7.0 standards.)

The second class, registered AppleEvents, represents standard AppleEvents specific to a given application or class of applications. This is where the headaches come in. The idea is that Apple will register and publish these events, much like the file-creator and file-type IDs, so that other applications can be modified to respond to (or to send) them. For example, Microsoft might register an AppleEvent for Word that tells Word to save the current document as a text-only file. That way, another application faced with importing (and converting) a Word document could instead ask Word to launch itself (a standard AppleEvent), to open the indicated document (another standard AppleEvent), and then perform the desired conversion (our hypothetical registered AppleEvent).

The third class, private AppleEvents, represents nonregistered events used between coordinating applications. For example, Claris might devise a set of private AppleEvents to communicate requests and information between its various applications, such as FileMaker, MacDraw II, and Claris CAD. (In fact, Claris has used its own technology to coordinate efforts between FileMaker and Claris CAD to demonstrate the concepts of IAC.)

Apple's dream: smaller, modular programs that perform a given task very well and that interact with each other. These concepts are good, but much work remains to be done for Apple's dream to become reality. At the Worldwide Developers' Conference, developers raised two major questions. The first was, Who decides what the registered AppleEvents are and how they're defined? Many developers expressed concern that the process would be dominated by a few major players (Microsoft, Claris, *(continues)*

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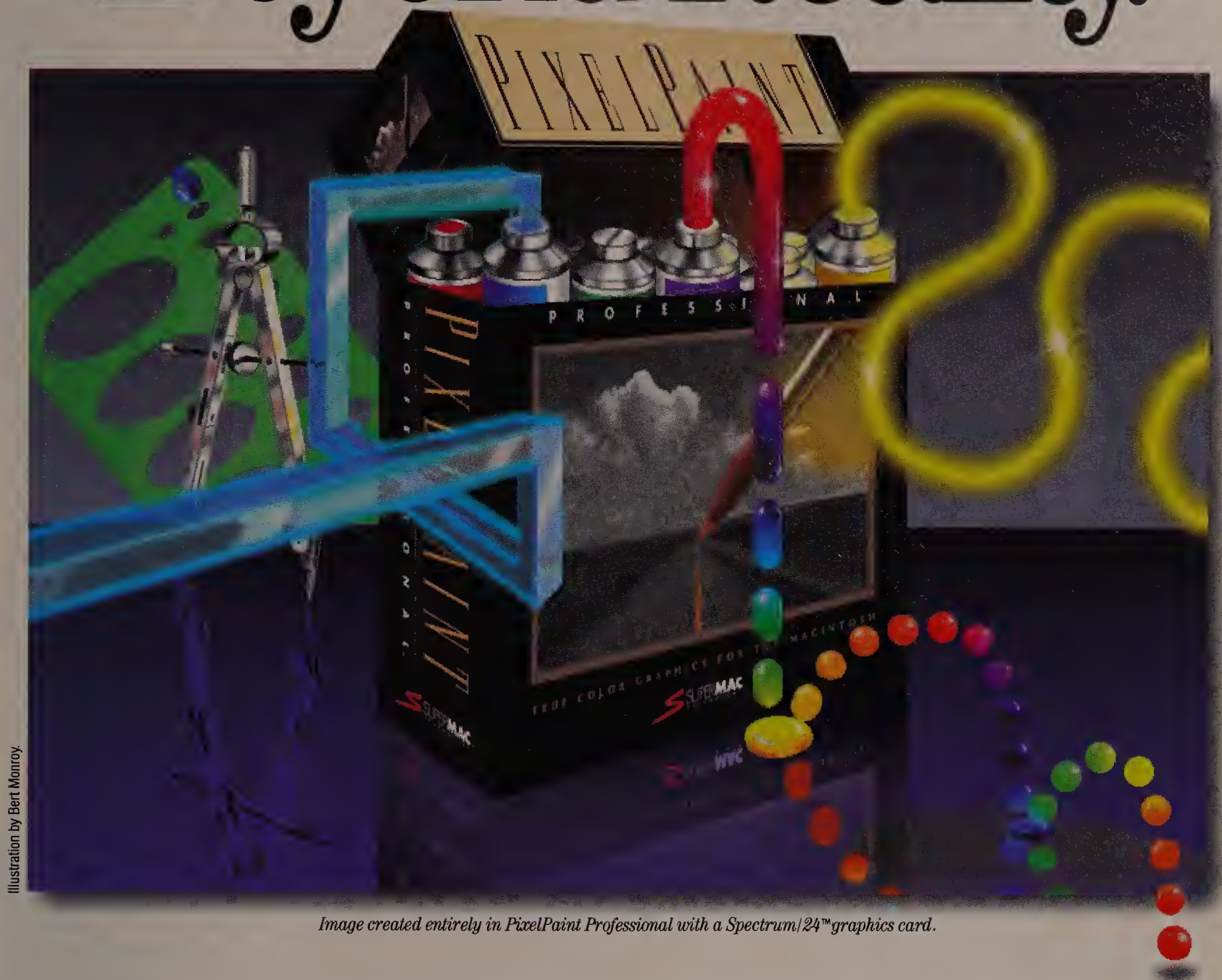


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Aldus), with little representation for smaller firms. Simultaneously, the attendees recognized that a truly representative (and thus very large) committee wasn't going to get much accomplished.

The second major question was, Just how does one go about writing a modular program? Initial developer complaints centered on a lack of sample programs, but beyond that there are a few chicken-and-egg issues. Modular programs will only be competitive when there is a large installed base of other modular programs (and System 7.0) for them to interact with. And the AppleEvents required won't be defined until people start writing modular programs and find out what they actually need (and want).

#### Virtual Ports

In some cases it may be useful for two applications to have closer links and more immediate communications than those provided by the Edition Manager and AppleEvents. For example, a

graphing application may be linked with a data-acquisition utility that will chart data as fast as it comes in. To support such needs, System 7.0 will provide the Program-to-Program Communications (PPC) Toolbox.

The PPC Toolbox introduces the concept of a port, a virtual (nonphysical) device through which applications can communicate. Through a connection to a common port, two applications can use low-level PPC I/O functions to pass data back and forth quickly. As with the other IAC facilities, PPC ports will connect applications over AppleTalk, allowing programs running on different Macs to share data readily.

Still, that capability may turn out to be something of a liability. If several applications on various machines are communicating via ports over AppleTalk, network performance may take a real hit. This is not to argue against AppleTalk functionality, but to point out that use of the proposed IAC functions may have some unan-

ticipated effects on system and network performance.

#### Is It Worth It?

Four questions remain. Will Apple's IAC proposals be fully implemented? When will IAC functionality become a reality? How much will you have to pay for it? Will it all be worth it?

My best answers: for the most part, yes; by early in 1992, a year or so after the release of System 7.0; serious money for software upgrades; in the long run, yes.

In the short run, you're best off planning to living with System 6.0.x and the old-fashioned cut and paste for some time to come. Don't jump quickly onto the System 7.0 bandwagon unless you're sure you have the time, patience, and money to pay the piper that plays the tune. **M**

*Contributing editor Bruce F. Webster can be reached via BIX (bwebster) and via MCI Mail (Bruce Webster).*

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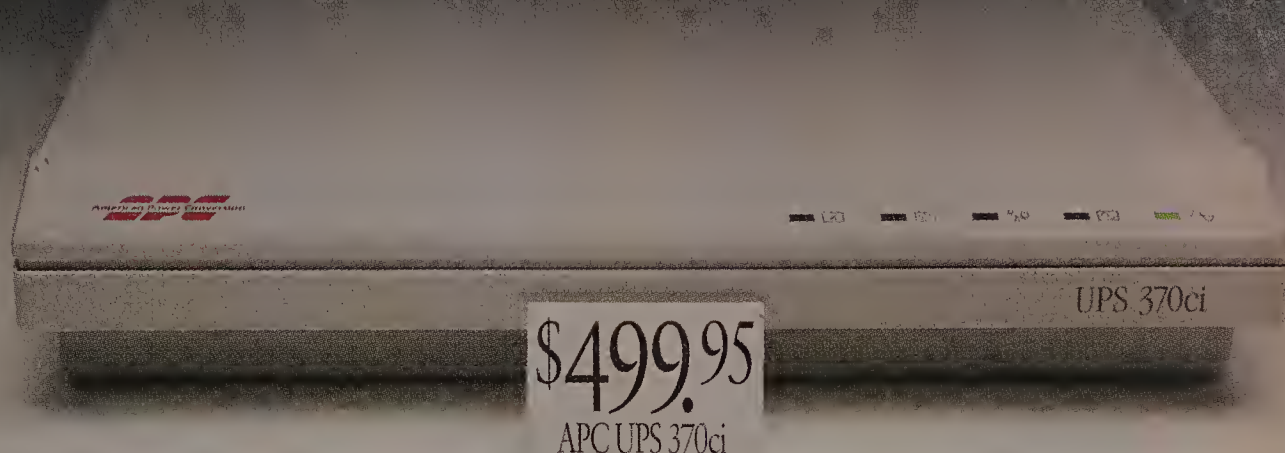
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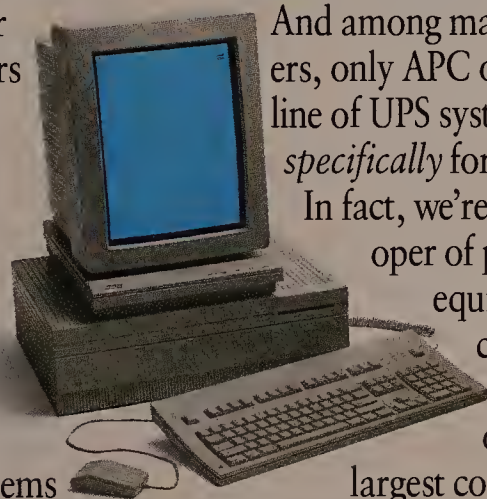
And because power disturbances can potentially do more damage to

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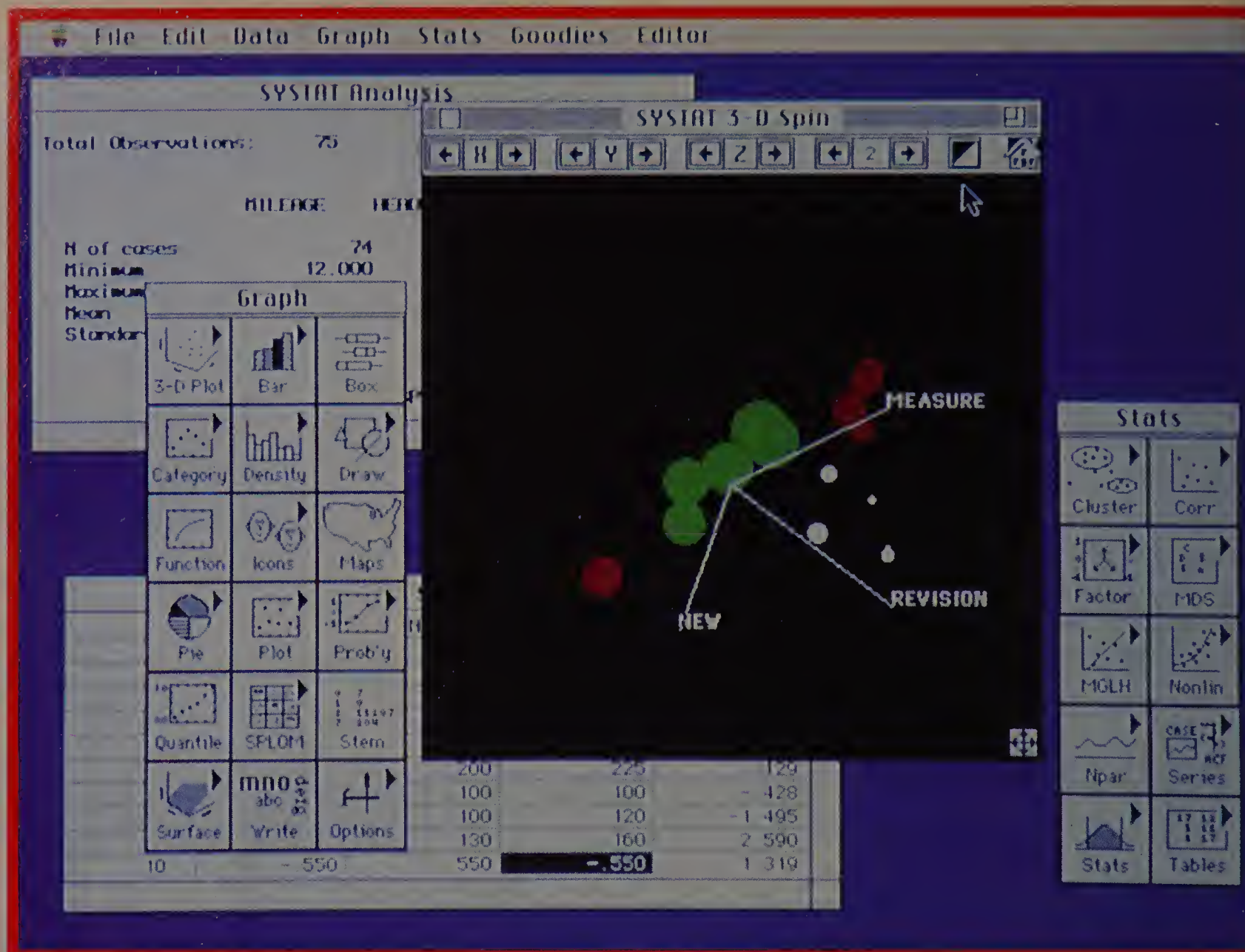
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AN INTERVIEW WITH JAMES VON EHR, PRESIDENT AND CEO OF ALTSYS CORPORATION

BY JERRY BORRELL

**J**ames Von Ehr is co-founder, with Kevin Crowder, of Altsys Corporation. The Plano, Texas-based company develops and publishes *Fontastic*, *Fontographer*, *The Art Importer*, and *Metamorphosis*. In addition, Altsys developed *FreeHand*, published by Aldus Corporation. Begun in 1984, Altsys is now a company of 26 employees and \$3 million in annual revenues. Before founding Altsys, Von Ehr worked at Texas Instruments for more than a decade. He has a B.S. degree in computer science from the University of Michigan and an M.S. degree in computer science from the University of Texas.

**MW** How did you begin working in the computer field?

**VON EHR** In 1973 after finishing school in Michigan, my girlfriend and I drove to Dallas in my Volkswagen bus to interview at Texas Instruments. We camped out the night before the interview, and she cut my long hair so that I'd look respectable. They must have liked me, because they made me an offer during the interview. The job was in the operating system group extending a FORTRAN compiler. TI had just announced the first affordable mini-computer—it cost \$20,000. That excited me, and it seemed like a great place to work.

**MW** What was your first exposure to Apple computers?

**VON EHR** The hardware maintenance engineer at TI who serviced our computers convinced me that I should have an Apple II. So in 1978 I bought one. I had an interest in music and I

built a synthesizer to connect to it, with digital-to-analog converters and patch panels everywhere. I started going to college for my M.S. degree at about the same time.

I finished my M.S. in 1982, and by then I was really busy with my work and my projects. I was doing assembly programming on the Apple II, writing music programs. I had been appointed senior member of technical staff at TI, and they loaned us 99/4A computers. I did some game programming on the TI99/4 home computer. TI published my program just before they got out of the personal computer business. I made enough royalties from the game to fund leaving the company in 1984.

**MW** Why did you leave?

**VON EHR** For a lot of the same reasons people leave big companies: the insecure, bad managers who will not let people grow, constant politics, unproductive meetings.

**MW** What happened in 1984?

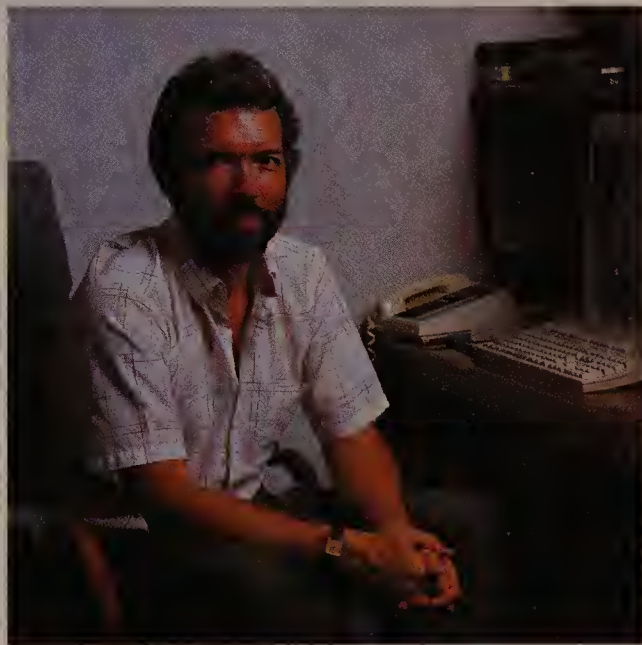
**VON EHR** In 1984 I did some consulting, wrote games for the Commodore 64 that were never finished, and bummed around. In early '84 the game market was collapsing.

**MW** How did you become involved in the Mac?

**VON EHR** At TI I had hired a summer intern, Kevin Crowder, who worked for me. He was going to go on to

graduate studies, but I convinced him to come work for me at TI. Kevin was the cofounder of Altsys.

We knew we wanted to work together and we kept trying to find something to do. We started a graphics presentation package on the IBM PC, like *Persuasion*. But the graphics performance of the PC was miserable. We liked the Mac but at that time it only had 128K of memory.



We thought about a CAD package, electrical CAD for PC-board layout on the Mac, but 128K of memory couldn't handle it. When the 512K Mac arrived we looked at it more seriously, but it still wasn't enough for CAD. Then Kevin had the idea of becoming a utility company.

**MW** Were there other utilities then for the Mac?

**VON EHR** Not really. At most there was clip art.  
(continues)





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**MW** How did you decide what to do?

**VON EHR** Kevin said let's do a font editor, there is no decent product for that. So we did Fontastic. We thought about it for two weeks. And on December 14 of 1984 we said yes. We went to our lawyer and incorporated, and bought a 512K Mac. We drove to Megamax, the people who wrote a C compiler for the Mac, and bought that, and started programming. We had to learn C and Mac programming. I signed us up as Apple developers so we had a copy of the draft of *Inside Macintosh*.

It was obvious to us that this was a serious computer; the manner in which it handled events and the managers were all like a real computer operating system. I have a lot of respect for the original guys who did that work. They had a lot of vision. And I have to pat the current guys on the back for keeping that vision going while keeping the operating system compatible.

**MW** How long did it take to write your first program for the Mac?

**VON EHR** From start to finish the program took three months. After that, we agreed the Mac was the hardest machine we had ever programmed for. That product was Fontastic. It had 5000 lines of code and cost \$39.95. It took up 40K on a disk.

**MW** When did you begin shipping?

**VON EHR** April of 1985. We placed our first ad in *Macworld*. I made it up, it looked terrible. I signed a personal guarantee with *Macworld* that I'd pay for the ad. Two days after it appeared we began to get calls. It was disappointing how the business built up. There were no mailbags of orders at the post office like you have a vision of as a small developer. Instead there was one letter one day, two or three on another, and none sometimes.

Then slowly the business built up. Fontastic was not very stable in those days; nothing was very stable then. I suspect that the Mac toolbox was not too stable. We fixed the bugs as we learned about them. We had a lot of experience at fixing bugs and with

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quality service at Texas Instruments.

Just before we shipped 2.0 we got calls asking if the product worked with LaserWriter fonts. We told people that the fonts would print on the LaserWriter but that they wouldn't like them because they were bitmapped.

**MW** That presented you with your next business opportunity?

**VON EHR** Yes. We started to work on Fontographer in June of 1985. It was for object-oriented graphics. It draws outlines of characters, not turning dots on and off like a paint program.

We demonstrated Fontographer at the first Macworld Expo in Boston, in 1985. People had lots of comments about various aspects of the program. How to achieve tangent joins, smoothing curves, and straight lines. We went back after the show and eventually totally rewrote the interface. That set us back one month. In January of 1986 we shipped the first Fontographer. We took the product to the January Macworld Expo and sales there paid for our attending the show.

**MW** What happened with Fontastic?

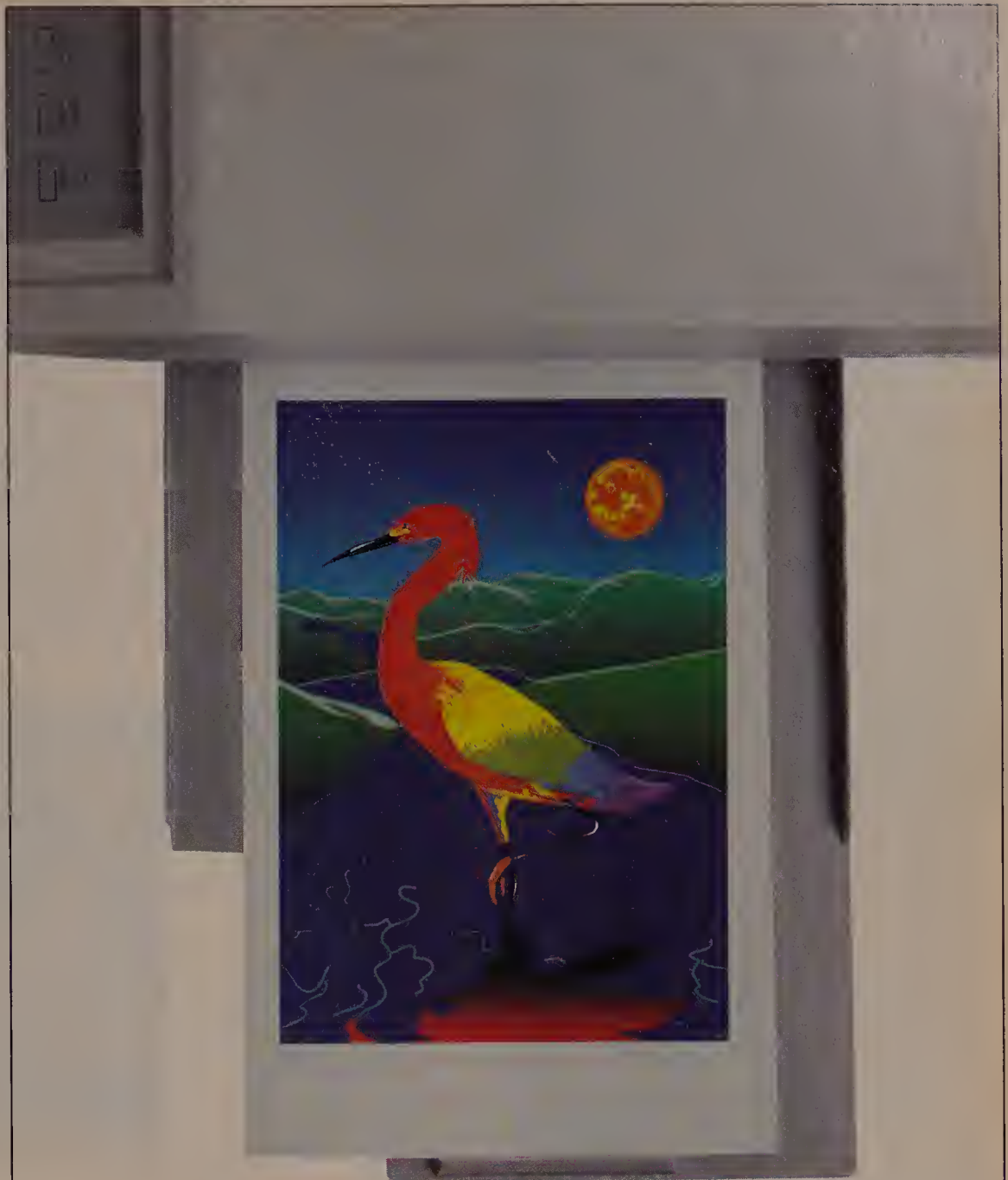
**VON EHR** By January of 1986 we reached a peak of 800 units sold per month. It made us happy. We came out with Fontastic Plus in 1987. People still do bitmap editing with it. There are probably 18,000 copies of the program out there.

By May of 1986 the success of Fontographer allowed us to move out of my house and into a real office. Fontographer cost \$395. We had learned about distribution of software, learned about pricing of software, that it doesn't just reflect the cost of development. We learned that developers don't get much of the money that is made from development of software.

**MW** How did FreeHand come about?

**VON EHR** Our Fontographer customers told us they wanted a PostScript drawing program. We had one in Fontographer but it was limited. So we got started on a much less limited program. We started in February of 1986 but with me as the only full-time pro-

*(continues)*



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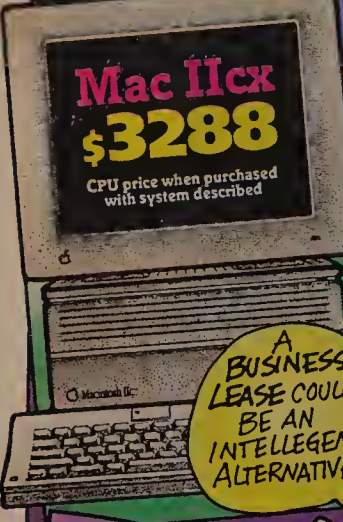
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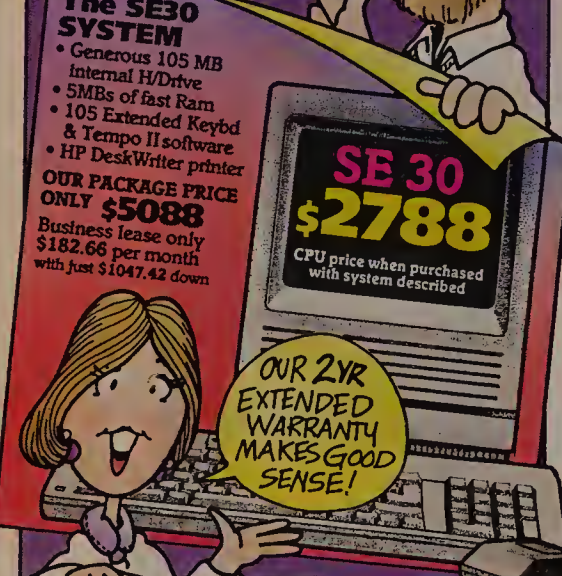
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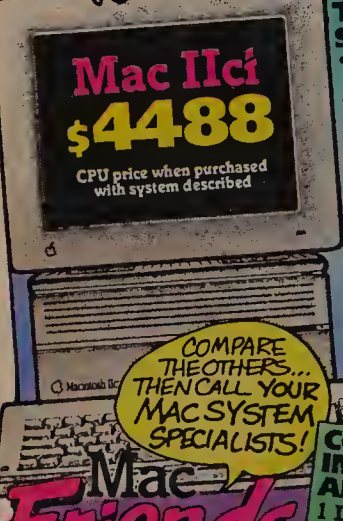


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grammer and Kevin part-time, we had to get help.

Kevin quit TI in July of 1986 and started working full-time on FreeHand. I was doing Fontographer 2.0. That just about sunk the company.

**MW** How so?

**VON EHR** We had preannounced Fontographer 2.0, so sales of 1.0 dried up. I was doing 80-hour weeks to finish up Fontographer, which was the basis of the short-term success of the company. It finally shipped in October of 1986. I think that helped earn us the respect of the industry; it showed that we cared, did quality software, and talked to our customers.

**MW** How was it received?

**VON EHR** Really well. Sales went up and the company was saved.

**MW** How did Aldus end up publishing FreeHand?

**VON EHR** As we were going along I realized what a big marketing project that product was. I realized we needed a bigger partner to make the most of the project.

We talked to Letraset and got serious with them. Then our Australian distributor found out what we were doing. Woolfe Hershberg at Infomagic in Australia called Aldus president Paul Brainerd, who was in Germany, and told him about our program—and told him that we were about to sell the rights to someone else. The next week I was at Aldus.

Kevin and I agonized for six weeks deciding who to go with. In retrospect, going to a big company was the right thing to do. People ask us "Don't you wish that you had the rights?" and "Don't you feel bad that Aldus gets

most of the money from the program while you just get a royalty?" But I'm not so sad. We couldn't have marketed that program ourselves back then so I'm okay with that decision.

**MW** You're still working on FreeHand?

**VON EHR** Yes, most of us at the company are working on the next version of FreeHand.

**MW** How did you advance from Fontographer to Metamorphosis?

**VON EHR** Our customers said they didn't want to draw existing artwork

over again. In Fontographer we ask them to draw the font or logo. If they already have these in some format, they don't want to redraw them. You could do that in Fontographer, but it takes a lot of work so we came up with the idea of KeyMaster.



*Illustration software is too hard-edged, too dull. The future is in better-integrated textures, to give more human feeling.*

**MW** What was that idea?

**VON EHR** To take any picture in any format EPS or PICT file and crack that file, understand it, and have the com-

puter write a PostScript font program to describe the object. The Art Importer [originally KeyMaster] imports a file and does that.

**MW** Why the change of name?

**VON EHR** KeyMaster became a trademark problem.

**MW** What is Metamorphosis?

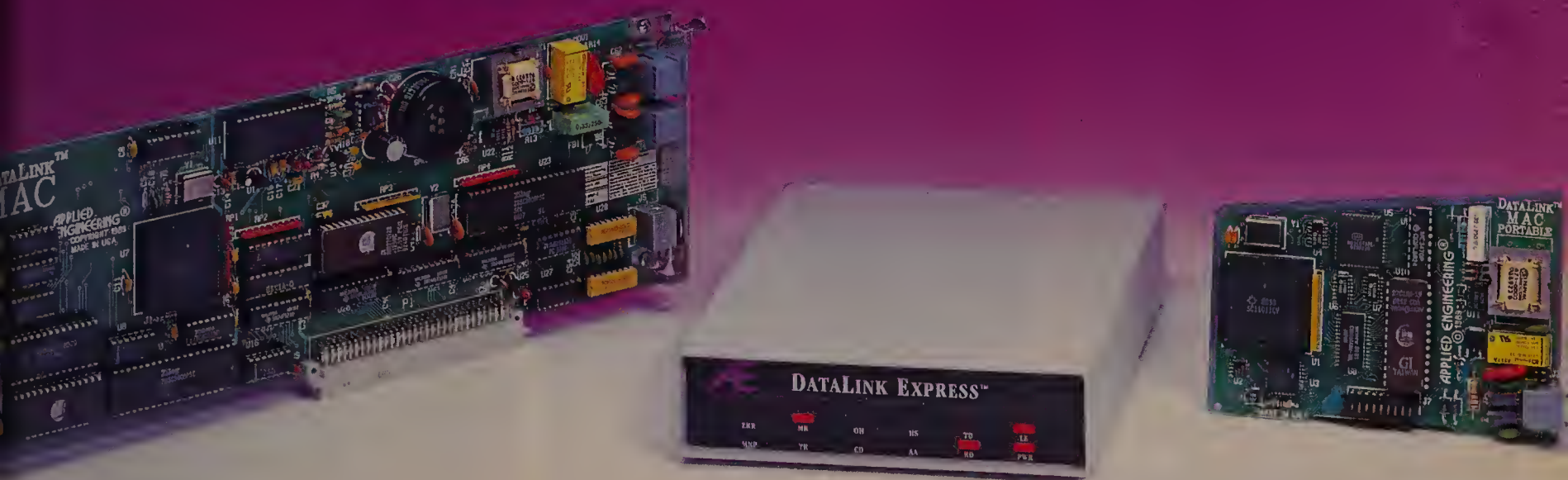
**VON EHR** Since we made Fontographer, people have wanted to import and manipulate PostScript Type 1 fonts, make display type, change the curl on the

(continues)

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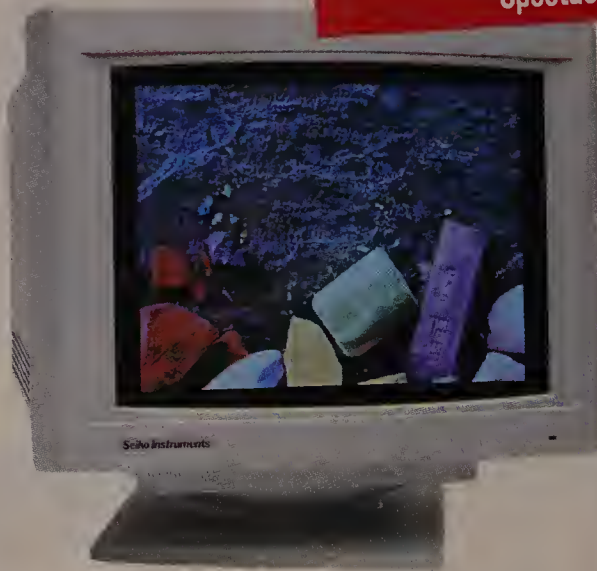
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Q, put their own logo into a font. They wanted to get access to outlines in FreeHand, to do effects.

Metamorphosis realized that need. It created the PostScript code. A hacker friend of ours developed a PostScript trick that allows us to extract a font outline from the laser printer. We actually pull the outlines from the printer.

**MW** Didn't that present problems for Adobe?

**VON EHR** Adobe is pretty careful about [allowing access to their fonts] and has a lot of safeguards to prevent people from getting access to them. But we announced Metamorphosis on the opening day of the Seybold conference at which John Warnock announced that the PostScript format has been opened. It was a relief on one hand and frustrating on another because we had a big announcement that was overshadowed by Adobe.

The program has two planned releases. The first allows us to convert Type 1 fonts to an editable format. the second release, which we're still working on, converts any font from one format to another—TrueType to PostScript Type 1 and the converse. And of course there are a lot of people interested in going the other way: those with installed libraries of PostScript fonts.

**MW** When will the second part be ready?

**VON EHR** As soon as Apple freezes the specification for TrueType, maybe this summer. We have it working and we're going to ship a version that does the conversion, but Apple changed the spec so we decided to hold off until the specification is frozen.

**MW** What is your perspective on the PostScript/TrueType conundrum?

**VON EHR** I'm pleased that Apple got Adobe to open up its font format. I also think that Apple has made a lot of work for all of us. TrueType is powerful but difficult to make type tools for. We should let users draw type and have the product store the outlines in whatever format users want without

knowing about the problems involved. And TrueType is extremely complex, worse than Type 1 PostScript fonts. We worked on Type 1 fonts for two weeks to develop a font tool, but it has taken us over a year for TrueType.

**MW** What is the problem?

**VON EHR** There are two problems. First, the data representation for TrueType fonts requires some approximations. Essentially the way we describe curves in Type 1 is the way we describe curves in PostScript, as a bezier curve. The problem with TrueType is finding out how to best approximate curves. It's always difficult to reduce a cubic curve to a quadratic curve (the type used in TrueType). It can take two or three quadratics to do that, and we have to figure out how to represent the TrueType font with the least number of curves. That's the first problem.

Second is the problem of hinting, which requires us to generate a program for TrueType. The issue is that this problem is more complex than is the case for Type 1 fonts.

**MW** Why?

**VON EHR** It's an issue of a descriptive versus a procedural approach. In Type 1 we specify important coordinates. For example, in a *T* there is a specification for the left and right sides of the vertical stem of the *T*. Type 1 hints assure that every stem of that font is the same. We have to provide hints that tell the Type 1 font how to interpret the width of features such as the vertical stem width. This interpreter makes all of the stems the right width when they are printed.

In TrueType you have to adjust each point on an outline. And the program for TrueType has to specify the order in which the points are adjusted—in Type 1 you just note the important points. In TrueType you have to specify what point to move where and in what order.

**MW** How do you write software to do this?

**VON EHR** In Type 1 fonts you just have data statements, hints that describe  
(continues)



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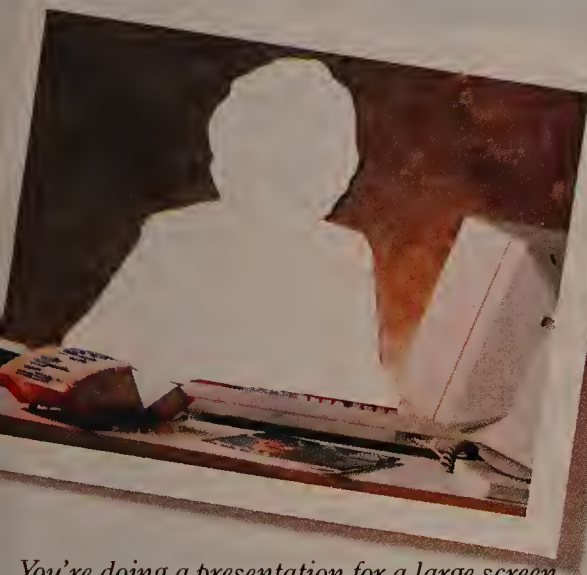
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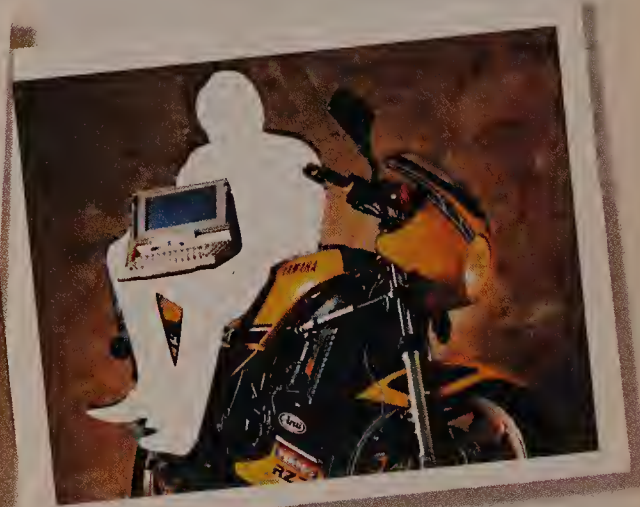
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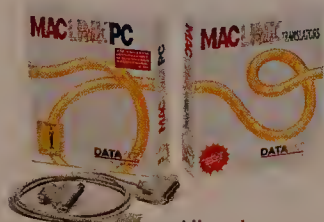
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VERBATIM

coordinates. In TrueType we must write a program in TrueType language; it's the equivalent of PostScript because it has its own language. It's kind of like a powerful assembly language. Consequently TrueType gives more access, more control, but at a cost. There are more instructions required to do things like give font hints.

**MW** So working with TrueType will be like learning with the red and blue books [basic programming references] for PostScript?

**VON EHR** Right. The difference is that TrueType is still evolving, still has capabilities missing. For instance, the ability to define procedures and sub-routines is somewhat weak. One example is the routine you would use to describe a call to the serif of a single character of a font. In PostScript that's easy, but in TrueType I'm not sure that it can be done. It may be my ignorance—we all have a lot to learn about TrueType, and we only have a rough draft of the equivalent of the PostScript red book.

**MW** What is the future of PostScript?

**VON EHR** I think that Adobe's development in PostScript 2 will address problems of version 1: problems with screen angles and screen frequencies that cause moirés in printing; also the problem in the first version of limits, for example in complex figures. PostScript flattens curves into short, straight segments that approximate the curves, but it has a limit of 1500 line segments. So if a particular figure is really complex it might print on the LaserWriter but not print on a Linotronic.

Also, the performance of PostScript 2 will be faster. And some of the technology for Adobe Type Manager will be incorporated into PostScript 2.

**MW** What is the future of Adobe Type Manager?

**VON EHR** I think that it's fairly good. Even with TrueType, ATM will have a reasonably big base, and TrueType won't be generally available for a year.

It's in developers' hands but not in the general public's, so that Type 1 fonts have even more chance to be established. TrueType will eventually be stronger if Apple and Microsoft improve it, and in two years it will be popular.

**MW** FreeHand and Illustrator—how do you compare the two?

**VON EHR** Hmm. I'll have to think carefully about that. I think I can say that FreeHand is easier to use. I think that Free-

Hand has more capabilities, that there is more that can be done with it. It was the first Mac product to have style sheets for graphics. FreeHand has named colors and so can edit colors more easily. Type handling is superior. Illustrator has smoother drawing and a bigger mindshare. Illustrator has a bigger installed base than FreeHand—Adobe was out there with the product for almost two years with no competition.

**MW** Will there be a PC version of FreeHand? With Windows 3.0?

**VON EHR** That's what will make FreeHand possible on the PC. We'll see something running in 1990, but probably not shipping.  
(continues)



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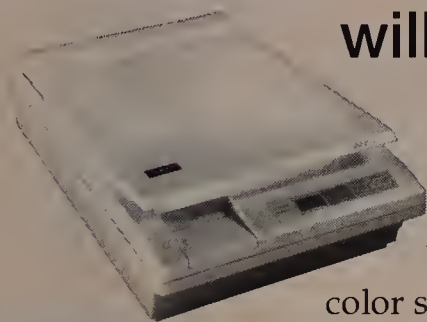


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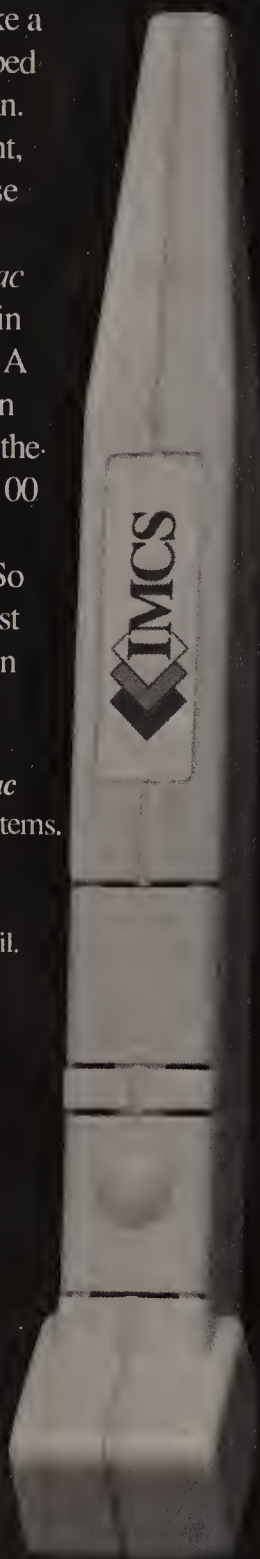


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**MW** How will the performance of the two products compare?

**VON EHR** The PC version will be comparable to the Mac version. Running it on a 25MHz, 386 machine will be comparable to a Mac II.

**MW** FreeHand is still slow. Why?

**VON EHR** Internally we have a display PostScript interpreter. Illustrator draws into the screen buffer, which requires a lot of memory, equal to the size of the screen. We don't require off-screen memory. The downside is that we have to convert to QuickDraw. We go through the work of display PostScript and then convert to QuickDraw calls. We did it that way to be compatible with the Mac programming model. Apple says clearly in the Mac programming manual not to talk directly to the screen.

**MW** Illustrator does that.

**VON EHR** Illustrator breaks when new Macs come out because Apple changes the rules of how QuickDraw works. With FreeHand we pay a price in performance to obey Apple rules. But we have taken that issue to heart and have an answer in 3.0. We're working on it.

**MW** Will we see the program at the August Macworld Expo?

**VON EHR** We are hoping. We're working on the ease-of-use and performance issues.

**MW** How about things like file conversions? The features in Adobe Photoshop that allow one to do that are really great.

**VON EHR** FreeHand is able to read PICT and EPS files and we plan to continue in that vein. We have always done color separation in FreeHand, as well as PostScript will allow, with its problems with both screen angles and screen frequencies.

**MW** Which Adobe will soon improve.

**VON EHR** Exactly.

**MW** Can Altsys make it as a small soft-

ware developer? We're in an era of mergers.

**VON EHR** I think we can. Our corporate charter is that we don't have to be the biggest or the fastest-growing company, but to be the best. When people think of Mac graphics I want them to think of Altsys.

We do look at acquisition and wonder if it is the right time to be acquired. I have a problem in going public or being acquired.

We're a little too small to go public, and the market punishes those companies that have long-term thinking. Next-quarter earnings are more important to public companies than the next three years. Management is always accused of short-term thinking, but they're graded for short-term thinking.

**MW** What about acquisition?

**VON EHR** There are two downsides. It is hard to protect employees' jobs. We only have 26 employees, so I do not have a lot of positions to cut. I am careful to hire good people so there are none to slash, and that is typically what an acquiring company does. There is a time to sell, and our original plan was to grow and sell the company. Most people believe that you sell a company when it is at a peak, but I disagree. I believe the time to sell a company is when products are mature in engineering and it is time to milk them for maximum revenues. Some people sell their companies when they are at their most popular. It would be time for us to sell the company now if that were our model.

And when companies are sold they immediately slow down. There are meetings, and you lose control to new managers who want to assert their own control. I think that right now it's a very competitive market and that if we spend lots of time in meetings we would fall behind.

**MW** What is the offer you couldn't refuse?

**VON EHR** Oh, three times sales. Say \$9 million.

(continues)





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**MW** Aldus is the obvious choice?

**VON EHR** Yes. But we get nibbles from others. Venture capitalists ask if we need money. I say we're doing well on our own.

**MW** How do you relate to Apple as a small developer?

**VON EHR** Apple treats us fairly well. They're working closely with us in the font area, especially in the area of Asian [nonroman] fonts, where we're pretty important to them.

**MW** As a small developer and publisher how do you relate to the retail and distribution channel?

**VON EHR** We are happy with MacAmerica in the distribution channel. They do a good job on the Macintosh side. They were the first with Mac products, they make consistent orders in reasonable quantity, and they are good about paying for software—an attri-

bute not shared by other distributors.

Mail order has been good for us as well. Our products are specialized, and not too many retailers want to put them on the shelf. Retail wants to buy Claris, Microsoft, Aldus, and Adobe and that's about it. If it's not a spreadsheet or database the retailer is not too interested in carrying it.

With Fontographer we're in distribution and mail order, and that is most of our sales. Almost none (2 percent) of our sales are direct, primarily those people without access to computer stores or those who don't like mail order.

**MW** What are the trends for paint and illustration software?

**VON EHR** Paint software, in the sense of black-and-white, bitmap editing is going away. We'll see more high-end paint packages such as PixelPaint Pro and ColorStudio—photo-retouching packages, not so much paint packages, with halftone editing features.

Illustration is going to get more painterly. I've been thinking for a long time that our illustration software is too hard-edged, technical, and too dull. Paint systems are much more human looking, but they have no quality when you zoom in. The future for illustration programs is in better-integrated textures, to give more human feeling.

**MW** What is the biggest challenge Apple faces in the near term?

**VON EHR** The company is surrounded by challenges. They have moved toward workstation capability and yet they can't abandon the entry-level people. They have to satisfy the clamor for the low-end machine without abandoning their vision of an easy-to-use, powerful machine.

**MW** What is a low-end machine?

**VON EHR** My idea? A Mac based on a 68030, at a low speed, would be OK.

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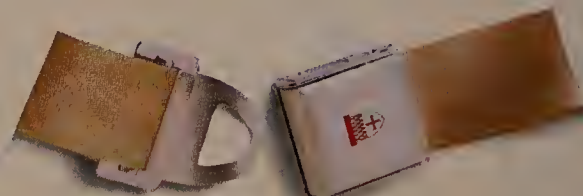
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I'm after a machine that will last ten years in the market, like the Apple II. To do that today a machine will need virtual memory. Applications years from now will need many megabytes to run. I would hate to see Apple make a machine today that won't run applications in a few years.

It must have space to upgrade RAM memory. It's OK to ship a machine with 1MB or 2MB of RAM, but it must be expandable. Expansion to 4MB is reasonable today. But in five years 20MB to 30MB will be needed.

The home computer that will finally be useful in the home will have a performance rate of about 150 MIPS, 100MB of RAM, a 1-gigabyte hard disk. And access to a high-speed network. We'll see that in the 1995-to-1997 time frame.

**MW** Do you have any comments about the demand for a low-cost machine?

**VON EHR** I get tired of people clamoring for a low-cost Mac. I don't want a

toy. If I wanted to program a toy I would work on Amiga or Atari machines. I want a computer that can do useful work for people at a low price. People bought lots of Apple IIs in the \$1500 price range ten years ago, so I don't think it's unreasonable to ask people to pay \$2000 today.

Comparing the Mac to Taiwanese clones is not useful. If you can get your work done on a PC clone, fine, then you should be using one. But many people can't get past the interface on a clone.

**MW** What do you think about John Sculley as the head of technical development?

**VON EHR** He'll be a busy man. I wish him well but I don't see how he can lead the technology group. He's a real smart guy, but he doesn't have the technical background to understand the issues.

Of course it could be a situation like at IBM where there is a lot of

technology within the company and marketing only lets a part of it see the light of day. There could be great technology in the Apple labs [and Sculley could facilitate its marketing].

**MW** What technology should Apple be adding to the Macintosh?

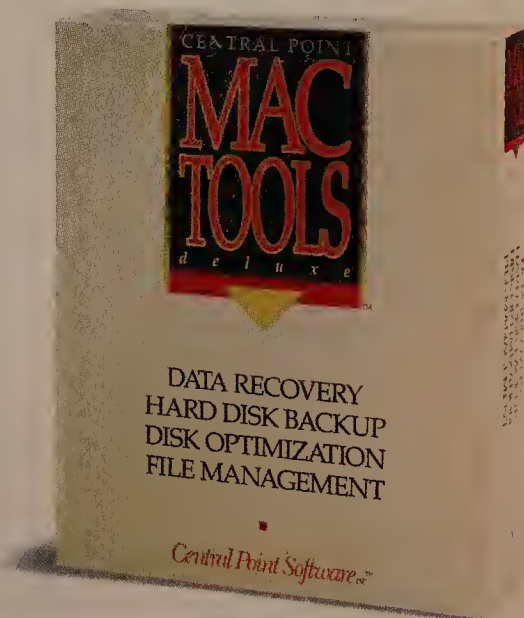
**VON EHR** I am intrigued by the object-oriented approach that Next has taken in its system software. I think that should be considered. Hardware-wise, we're missing graphics accelerators, but there is another issue in hardware. DMA [direct memory access] is needed to increase the access speed to the disk. There is a lot of commentary about the need for multitasking, but that will depend upon the availability of DMA.

**MW** Are Mac clones a possibility?

**VON EHR** I talked to someone two years ago who wanted my help in building  
(continues)

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	MAC TOOLS	SUM II	FASTBACK II	RETROSPECT	DISK EXPRESS II	GOFER	SENTINEL
HARD DISK BACKUP	✓	✓	✓	✓			
Selective backup & restore	✓		✓	✓			
Data compression	✓		✓	✓			
Save file/folder selections	✓		✓	✓			
DATA RECOVERY	✓	✓					
Selective/intelligent search	✓						
Pause & view during undelete	✓						
Recover files in-place	✓						
OPTIMIZER	✓	✓			✓		
Visual display of fragmentation	✓				✓		
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one. They wanted me to work on the system software in the ROMs. I told them no, that there was too much work there. I estimated 100 man-years and that was two years ago.

**MW** But it could be done?

**VON EHR** Yes.

**MW** In a legal way, much as IBM ROM BIOS was cloned?

**VON EHR** It could be, but Apple is a moving target. You've got the SEs, the Mac II, the IIfx. The question is what functionality you would want to implement. The Mac has a massive software-development investment; the hardware is not a problem. But Apple understands that the value lies in its software these days.

**MW** What are your favorite products, other than your own, in hardware and software?

**VON EHR** Think C. It's the best development environment we've ever seen. It's better than Apple's MPW because the turnaround time is so fast. You can make changes and see your program run. It's the fastest we've ever seen, even on workstations. But we're up against its limits now with development on FreeHand. To do FreeHand we have to merge some of the external subroutines where we blow the jump-table limits.

For software, I admire the simplicity of MacWrite. I use version 4.6. I don't need any more power for what I do, and it's better than Microsoft Word for letter and word spacing. DeskPaint [Zedcor] is still available without upgrading to DeskWorks. And the first time I saw PixelPaint, it amazed me. It was one of the first to use pop-up menus like FreeHand's.

For hardware, the Mac IIfx and the LaserWriter IINTX hum along pretty well.

**MW** We are seeing a lot of companies releasing fonts on CD. Is that the future?

**VON EHR** I have a question about the quality of a lot of the type on the discs. There is a lot of quantity.

**MW** Aren't we talking about the standard type libraries from companies like Linotype and Monotype?

**VON EHR** I believe that those companies would disclaim creation of some of the type on the discs. Remember that fonts can be implemented poorly.

**MW** What about gray-scale fonts?

**VON EHR** We don't believe in them. Apple doesn't believe in them. They're



*A 24-point gray-scale font,  
when scaled to 25  
points, turns to garbage.*

*Gray-scale fonts  
just don't scale well.*

useful for one thing, video. You can't print them if you don't have a gray-scale printer. There is no on-screen support for them, and there is limited support for gray scale on the Mac II ROM chips. Letraset makes them. But a 24-point gray-scale font, when scaled to 25 points, turns to garbage. They just don't scale well. ATM doesn't support them. TrueType doesn't support them.

**MW** But they make a computer screen as readable as paper?

**VON EHR** Yes, by blurring the characters. I would rather increase readability by increasing the resolution, by moving from 72 dots per inch to 96 dpi or to 144 dpi. At 144 dpi you have twice the resolution

and characters are crisper.

**MW** What do you think about the Personal LaserWriters?

**VON EHR** It's great for the Mac and great for us if more people can afford laser-printer quality. It also opens up an interesting opportunity for someone to do a PostScript-printer driver, if they're quick. A lot of our customers require PostScript-quality graphics, but with ATM and TrueType, everyone can get excellent fonts, even on a Quick-Draw-based printer.

**MW** What is the future of Mac type?

**VON EHR** The market is getting full. All the major players are now in the Mac market. So there will be a shakeout. I predict prices will drop.


There will be a lot of jockeying with TrueType, which presents a new opportunity for sales. I see lots of opportunities for tool makers. Now that the market has opened, Adobe has removed the quality barrier so that Fontographer users can produce type of the caliber of the major type foundries.

**MW** Who do you expect will be the new font developers?

**VON EHR** Most graphic artists I know have at least one typeface in them. One font that they would like to see on paper. And many companies will want to do their logos.

**MW** Can small type developers really succeed?

**VON EHR** Casady & Greene has begun to be considered a serious type foundry. Zuzana Licko at *Emigre* magazine. David Berlow, formerly of Bitstream, has founded a company with Roger Black called The Font Bureau [in Boston], making fonts for magazines.

There is a renaissance of small type houses. People can get into the market for a low up-front expense, and they are only limited by their creativity. Top font designers from throughout the world are working on the Mac, like Matthew Carter, vice president at Bitstream. Matthew has said to me that the tools on the Mac today are better than ever before. 





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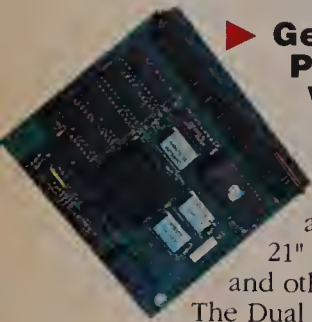
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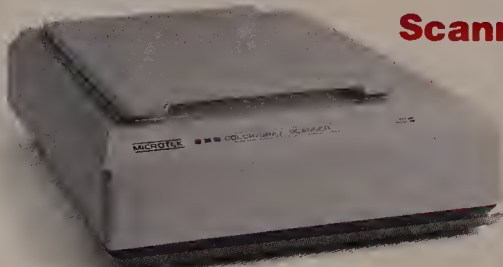
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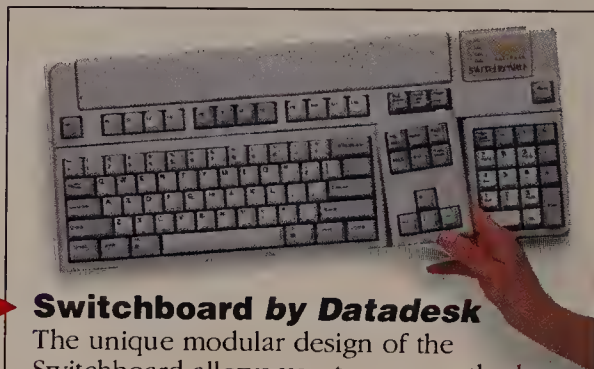
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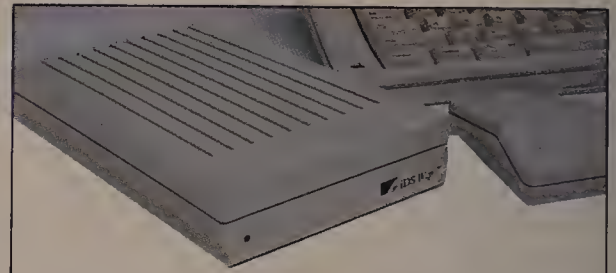
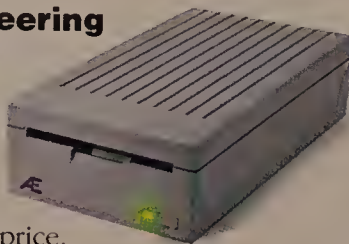
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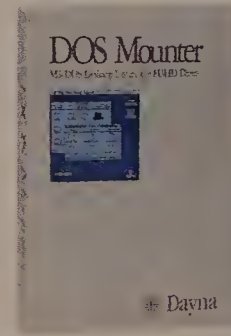


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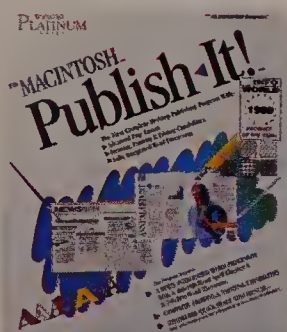
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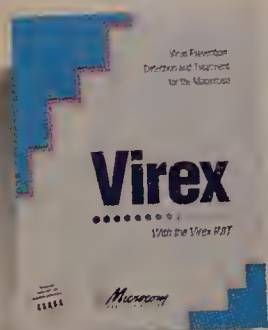


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# MACWORLD NEWS

by Dan Littman and Tom Moran

## The Return of Illustrator



Adobe Illustrator is getting a long-awaited upgrade. Illustrator version 3.0 has a simpler, less modal interface, built-in chart-making tools, and greatly improved text features.

You can enter and edit text directly on an illustration without going through a dialog box. Text blocks have no size limit; can contain any mix of fonts, sizes, and styles; and support kerning, tracking, leading, and other precise typographical controls. You can convert Type 1 fonts to outlines to modify letters as Bezier curves; you can flow text into columns, inside a series of linked objects, or attached to a curved path.

Version 3.0 generates a variety of bar, line, area, scatter, and pie charts from numbers you import or type into a table. It provides none of the number-manipulation features of other graphing tools such as DeltaGraph or KaleidaGraph, but it can transpose rows and columns and lets you set the scale—for example, one head in a population graph can represent 1000 people or 1 million. You can save a graph as a template and apply it to a different set of numbers.

In Illustrator 3.0 you can select and edit single objects in a group without ungrouping; add points to or remove points from a curve; grab and manipulate bezier curves directly; and convert corner points to smooth points, largely eliminating the need for the tedious scissors tool.

Aldus FreeHand 2 still has it over Illustrator 3.0 in a few areas. Illustrator does not permit drawing in the preview window, requires using the Blend tool to create even simple foun-



ROSA LAU

Enjoying a sunny day in Silicon Valley: the Adobe Illustrator 3.0 team (left to right) includes Rudi Sherry, Richard Cohn, Joe Holt, Teri Pettit, and Bruce Hodge.

tains, and cannot import TIFF files as templates or art (it will import EPS files and incorporate them in a final piece).

Illustrator 3.0 should ship in September. It will list for \$595 and require two megabytes of memory. ATM and Separator 3.0 will be bundled with it. For more information, contact Adobe Systems in Mountain View, California, at 415/961-4400.—D.L.

## Animation for Sign Language



Advances in computers that can generate speech—and respond to it as well—are giving the visually impaired access to computers and all the information they make available. But barriers for the hearing impaired, who often have difficulty learning to read, have been

slower to fall. A group of linguists at the Center for Sign Language and Communication of the Deaf at Hamburg University in West Germany have been working on this problem for ten years, first documenting the grammar of sign language, then developing a *(continues)*



A sign in HamNoSys with its character from the HamNoSys font just below the thumb.



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MARTIN BRANDIS

**Rolf Schulmeister, Hamburg University linguist, programmer, and sign language expert.**

standard method to transcribe sign language, and now designing a set of HyperCard-based tools for recording and animating sign, building dictionaries, and converting between sign language and text.

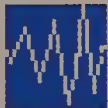
Since sign language is neither phonetic nor character based, it requires a new kind of alphabet. The Hamburg Notation System (HamNoSys) uses about 200 symbols to indicate the shape of the hand, its position, spatial location, and movement, all of which are represented with a special font. Primary programmer Rolf Schulmeister says *mimics*, or commonly used facial gestures, vary so widely by country that it will be much more difficult to incorporate them; but extensions to give HamNoSys some mimics capability are in development. For those who haven't mastered HamNoSys, the HamNoSys Editor simplifies transcribing sign by leading you through each step.

A second tool called HANDS (Hamburg Animated Dictionary of Sign Language) can animate transcribed words by arranging a sequence of images from a picture database and playing them under VideoWorks to animate a person's head, body, upper arms, lower arms, and hands. Hearing people can use HamNoSys and HANDS to learn sign language, while the deaf can use them for writing and for reading transcribed materials.

In Germany, where the process of converting universities into basic re-

search centers for industry has not proceeded as far as in this country, academics are not permitted to profit by government-funded research, so the team's product will be distributed at cost. The group plans to develop a system that understands grammar and can convert whole sentences; it also wants to develop a sign language E-mail system. Long-term plans call for a system that could transcribe sign language from a videotape. For more information, write Prof. Dr. Rolf Schulmeister, Universität Hamburg, IZHD, Sedanstrasse 19, D200 Hamburg 13, West Germany, or call him at 49-40-4123-3851 or 49-40-4123-3240.—D.L.

## The Sound and the Graphics



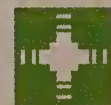
The folks at Motorola who make the microprocessors that are the heart of every Mac, have come out with a chip that promises to merge sound and graphics in ways not possible before. The 96002 Media Engine is a digital-signal-processor chip with added I/O capability that allows it to act as a sound-and-graphics processor for multimedia and other applications. The chip can work with Motorola 68040, which has begun shipping, or with other microprocessors such as Intel's 80486.

The 96002, designed to produce compact-disc quality sound and graphics, can operate at a very hot 50

MFLOPS (million floating-point operations per second). Although it adds the floating-point math capability, the chip is basically a 32-bit version of Motorola's 56001 digital signal processor, which is used for digital audio devices and in the Next machine.

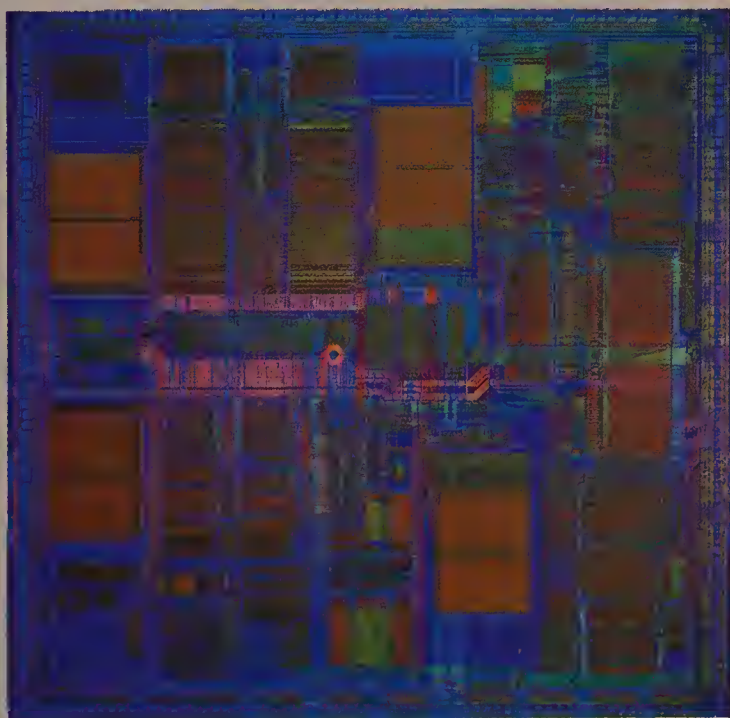
Expected applications include animation, 3-D graphics, compression and decompression of full-motion video, and image modeling. Several vendors are working on products containing the chip, including Ariel Corporation, which said it is shipping the MM-96, a board for the PC AT and compatibles that can hold one or two 96002 chips. The board, intended for scientific, industrial, or multimedia use, may also come out in a Mac version. For more information, contact Ariel Corporation, in Highland Park, New Jersey, at 201/249-2900.—T.M.

## Islands in the Screen



Farallon Computing has brought out new versions of its Timbuktu and Timbuktu Remote screen-sharing programs, and has also introduced several hardware products for connecting Macs to Ethernet. The new Timbuktu, version 3.1, lets you see and control the desktops of several Macs at once, with each desktop appearing in a different window. Timbuktu connects to the other Macs via the LocalTalk network. Previously you could see the desktop of

only one other Mac. The new Timbuktu Remote, version 2.0, lets you see your own desktop in a resizable window while you control a second Mac over a modem. The previous version of Timbuktu Remote did not let you see your own desktop and the remote desktop at the same time. Timbuktu Remote 2.0 also adds a call-back feature for added security over the modem, and CCL scripting that lets you go through an in-



**Photomicroscopic view of the 96002 Media Engine, a digital signal processor that handles graphics and sound.**

(continues)



# Since 1985, One Mac Accounting Program Has Made The Most Sense For Small Businesses.

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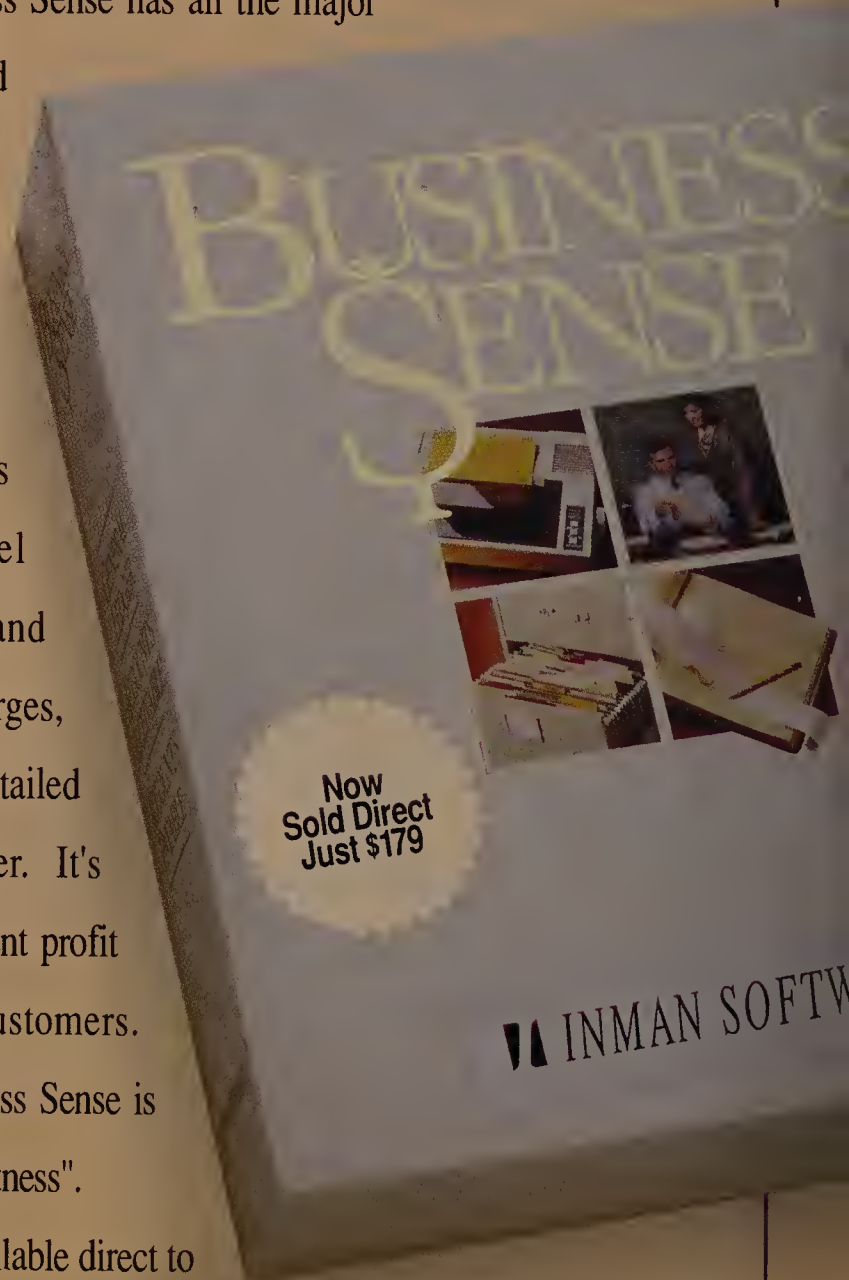
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might need including multi-level passwords, customer invoicing and statement generations, finance charges, full income and job cost reports, detailed account histories and general ledger. It's powerful enough to handle 99 different profit centers, 500 vendors and 2000 customers. MacUser Magazine said that Business Sense is "an excellent effort on the verge of greatness".

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**INMAN**





house digital phone switch or PBX.

Farallon also introduced a LocalTalk star controller called the PhoneNet StarController Series 300, and the StarController EN Series 500, an Ethernet hub that uses inexpensive twisted-pair wire. The 12-port Series 300 is easier to install than the Black Beauty StarController that it replaces, and it can both detect and clear jammed ports. The Series 500, which also has 12 ports, runs Ethernet at 10 megabits per second and complies with the 10Base-T Ethernet standard. Both network controllers come with Farallon's StarCommand network-management software, which monitors the network while running in the background.

Timbuktu 3.1 is currently available and lists for \$149. Timbuktu Remote 2.0 was expected to begin shipping in late June or early July at a suggested list price of \$195, the same as the previous version. Upgrades to the new Timbuktu Remote will cost \$50 for the first copy and \$5 for each additional serial number. The StarController Series 300 is shipping at a list price of \$1295. The StarController EN Series 500, also available, lists for \$2495. For more information, contact Farallon in Emeryville, California, at 415/596-9100.—T.M.

## FilmMaker Puts It in the Can



Advent Computer Products is distributing FilmMaker, an animation and presentation package originally published in France by Arborescence. FilmMaker combines many of MacroMind Director's animation tools with rendering and presentation features.

Like Director 2.0, FilmMaker can composite animated images, import PICT or PICS files, combine animation with sound, perform some interactive functions, and play animations in Hy-

perCard. But FilmMaker has some significant features not found in Director 2.0. It is actually a set of four applications (Animate, Color, Sound, and Present) and five utilities (FilmMaker DA, Mark, Picture Runtime, Sequence Runtime, and Sequence Transfer).

Animations are composed in Animate, color effects added in Color, sounds added in Sound, and the final presentation composed and played back in Present. The utilities perform a wide variety of functions, such as converting pictures from graphics applications into FilmMaker format and running animations inside HyperCard.

The Animate application supports numeric control of an object's location, rotation, and color. Animate also has rendering functions like antialiasing, dithering, and remapping. An outstanding feature is its ability to create parent-child relationships between objects. Like the three-dimensional modeling program Swivel 3/D Professional, objects can be linked so that they move together or in relation to each other. Unlike Swivel, linked objects in FilmMaker also share color changes, and the Tree window shows which objects are linked together.

The Color applica-

tion has an eyedropper tool for selecting and changing colors either one frame at a time or by groups of frames, to allow color effects like fades. Present is an object-oriented environment for linking animated sequences, transitions, and other parts of a presentation. It can create buttons and key commands that trigger transitions to the next element, and it can even open other applications and load their files.

FilmMaker ships in a metal film-reel canister for \$1995. It requires 5MB of RAM. For more information, call Advent Computer Products in Encinitas, California, at 619/942-8456.

—Jonathan Cassell

## A One-Mac Band

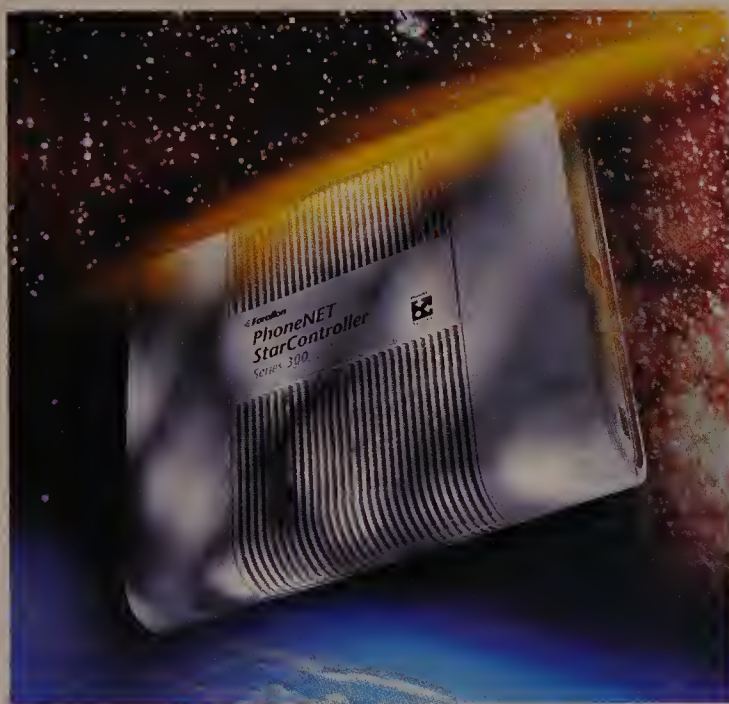


Composer-sculptor-inventor Trimpin suffers from allergies to brass and wood that forced him to stop holding brass and woodwind instruments to his mouth. No matter, though: he now plays brass, woodwinds, strings, and percussion instruments, not to mention garbage cans and clogs, with his Mac. For the past 15 years, he has been designing and building electromechanical devices that attach to acoustic instruments and play them in response to MIDI signals.

Trimpin descends from a long line of German inventors including—he is sorry to say—the one who, in the 1640s, created the first alarm clock. Trimpin's computer control of acoustic instruments opens realms of musical possibility, placing him at the fore-  
(continues)



Getting ready for 1992: Arborescence used FilmMaker to prepare this animated presentation for Apple Europe.



TOM GIBSON

Farallon's PhoneNet StarController Series 300 connects and monitors up to 12 devices in a LocalTalk network.



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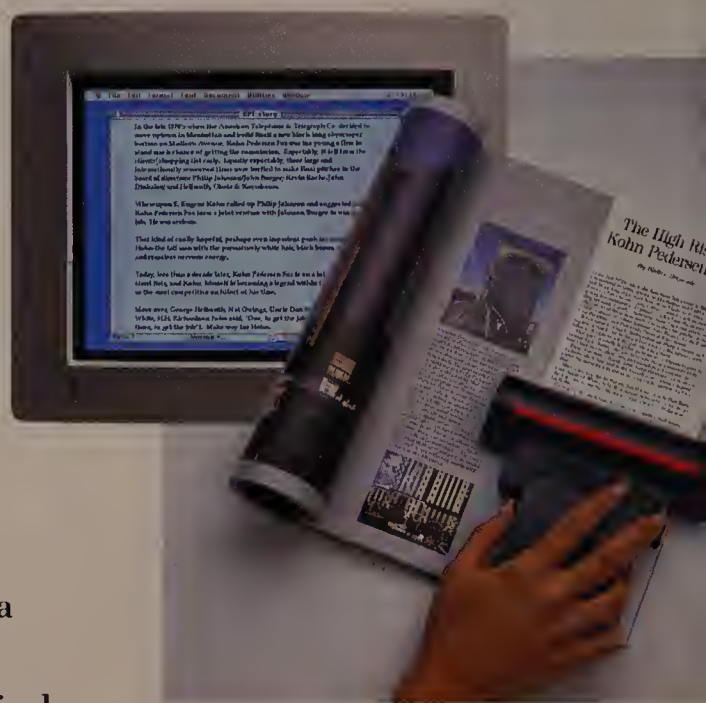
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front of a musical avant-garde. Until now, so-called computer music has been played on synthesizers. Acoustic instruments have been played alongside or interactively with computers, but not by computers.

Using the Mac, Trimpin controls his orchestras as no human conductor can. For example, he can play an unlimited number of tempos at once, and can synchronize instruments exactly. Exact synchronization is critical for creating the resonant effect essential to his compositions. He can also play each of his instruments beyond human capability—using 20-note chords, for example, or playing at superhuman speeds.

Trimpin automated acoustic instruments, instead of working with synthesizers, because of the former's resonant qualities. He refers to his compositions as psycho-acoustic—written with human perceptual facul-



DALE WINDHAM

**Composer-inventor Trimpin has designed circuit boards and mechanisms for playing a host of acoustic instruments.**

ties in mind—and one of his main interests is the way sound moves through space. He arranges instruments in a circle, with the audience in the center, in order to make sound travel in different directions around the room. He can, for example, play a theme in the left-front corner of a room, expand it in the left-rear corner, play an opposing, contrapuntal motif across the back wall on a different set of instruments, play with echo effects, or make a single sound seem to move.

Trimpin uses various Macs with Mark of the Unicorn's Performer (MIDI software). He designed the boards for his electromechanically modified instruments, using 6809 CPUs, custom-coded EPROMs, UARTs (communications protocol chips), and VIAs (versatile interface adapters). He has also invented input devices, including a light-sensitive one that he uses to compose. The device senses the shadow of his hand interrupting the light.

As yet, Trimpin has no interest in recording, he says, because current recording technology cannot duplicate the acoustic elements of his compositions. Instead, he performs live and creates sound sculptures. In 1990–1991, he and/or his work will be at the Los Angeles Arts Festival; Seattle's Bumpershoot Festival; the Banff Center for the Arts; Minneapolis's Walker Art Center; New York's Hall

of Science; the Portland, Oregon, Art Institute; Vancouver New Music; and San Francisco's New Langton Arts.

—Ann Garrison

## Minitab Makes the Mac



Minitab is a statistical software package developed in the 1970s for mainframes, now available on the Macintosh. It was originally targeted for statistics students and lacked some advanced capabilities found in other statistical packages such as SPSS. Minitab was popular for its easy-to-learn interactive approach back in the days when most statistical packages were largely batch oriented. Current releases of Minitab have much-enhanced statistical capabilities, and the application is now used by many professionals, though it still lacks some significant functions, particularly for analysis of variance. The program's macro feature makes it possible for users to fill in gaps in Minitab's capabilities, and the Mac version ships with a collection of popular macros that run inside Minitab or under Apple's MacroMaker.

The Macintosh version of Minitab is a complete replication of the mainframe package, including support for its limited, mainframe-oriented graphics tools. People familiar with Minitab will be able to use the Mac version immediately, and extensive online help files are available in case you need to brush up on anything.

Minitab barely uses the Macintosh interface. Only a few basic commands, mostly for importing and exporting data, appear on the menu bar. Even text files created by Minitab require a separate application for editing (miniWriter, a text-editor desk accessory, is included for this purpose). Still, despite its command-line nature, Minitab remains remarkably easy to use, thanks in part to its relatively simple language. Once you become familiar with the language, you may even find it simpler and quicker than more Mac-like statistics packages. But users wanting a more typical Macintosh approach will probably prefer programs like StatView, and users wanting the most complete set of features will probably *(continues)*



DALE WINDHAM

**One of Trimpin's instruments, converted to play under Macintosh control.**





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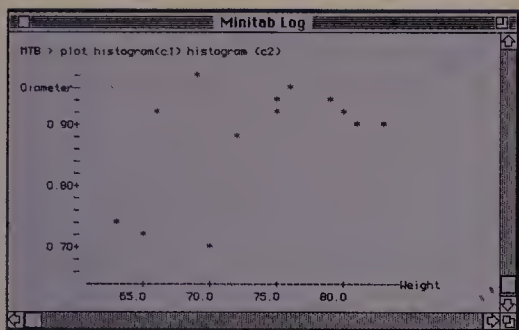
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# Linotype

**SETTING THE STANDARD**





**Minitab's rudimentary graphing ability reveals the easy-to-learn statistical program's roots in the mainframe world.**

prefer programs like Systat. Instructors using Minitab in their courses are likely to be first to welcome the Macintosh version, and eventually Minitab's publishers plan to give the program a true Mac interface.

Minitab lists for \$695 and comes in a version for the Plus and SE and one for the SE/30 and all Macintosh IIs. It requires a hard drive and 1MB of RAM. Those unfamiliar with Minitab can order documentation at extra cost (an order card comes in the box). For more information, contact Minitab in State College, Pennsylvania, at 814/238-3280.—**Ted Landau**

## PostScript Prices Drop, Printers Get More Intelligent



The printer wars are heating up, with several vendors offering lower-cost PostScript printers. Among these are GCC Technologies, which has introduced PostScript versions of its popular PLP II and PLP IIS, and QMS, which announced its QMS-PS 410. The new GCC printers are the Business Laser Printer II (BLP II) and the Business Laser Printer IIS (BLP IIS).

GCC's BLP II prints 4 pages per minute and has a suggested list price of \$2299, while the BLP IIS produces 8 pages per minute and lists for \$2799. The QMS-PS 410 prints 4 pages per minute. At press

time, QMS had not finalized the printer's list price, but the company said its goal was \$2795, give or take \$100. The GCC printers actually use an LED-array-print engine from Oki to draw the page image on the print drum. The QMS-PS 410 uses the Canon LBP-LX laser-print engine.

The new GCC and QMS printers all have one serial port, one parallel port, and an AppleTalk connector. The QMS-PS 410 has an Emulation Sensing Processor that can tell whether a file is in PostScript, HPPCL (Hewlett-Packard Printer Control Language), or HPGL (Hewlett-Packard Graphic Language) format. HPPCL is used by HP's popular LaserJet family and many other PC printers. HPGL is most often used in plotters. Having sensed the type of file, the QMS-PS 410 automatically switches to the appropriate printer emulation.

The QMS-PS 410 was slated to begin shipping in July. The GCC printers were scheduled to be available beginning in June. Apple also planned to begin shipping in July its Personal LaserWriter NT, a 4-pages-per-minute PostScript printer with a list price expected to run about \$3300. (See "LaserWriters for Less," August 1990.) For more information, call GCC in Waltham, Massachusetts, at 800/422-7777, or QMS in Mobile, Alabama, at 205/633-4300.—**T.M**



**GCC Technologies' BLP IIS is an 8-pages-per-minute PostScript printer that carries a list price of \$2799.**

## Vector + Raster = Shapes



Shapes, a new program from Letraset, blurs the distinction between PostScript (vector-based) and bitmapped (raster-based) graphics. It also blurs the hard edges of PostScript graphics with an antialiasing feature, allowing you to output good-looking text and graphics on non-PostScript media, including color printers, film, and video.

Shapes adds a PostScript drawing layer to Letraset's ColorStudio. While ColorStudio's image and mask layers



**The QMS-PS 410 can tell a Macintosh PostScript file from an HPPCL file generated by an IBM PC. It can print either.**

are raster based, the layer added by Shapes is vector based; PostScript objects overlay the graphics in the other layers. Unlike other PostScript graphics programs, Shapes allows you to soften the edges of objects, a capability that should delight anyone who uses the Mac in video or film production, where antialiased text is a must.

In addition to improving the appearance of text, Shapes' antialiasing can eliminate the need for trapping, a problem that has plagued many who print color separations on the Mac. Since Shapes can soften the sharp line between two adjoining colors, a slight misalignment when printing won't cause the thin gap that sometimes appears between different ink colors.

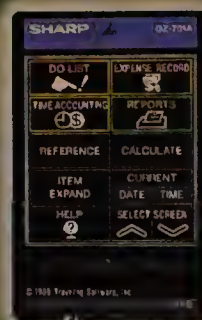
Shapes is a PostScript RIP (raster image processor). When you print a ColorStudio document on a PostScript printer, the PostScript objects print as a PostScript overlay to the bitmapped image. When you print to a non-PostScript device, the PostScript objects

(continues)





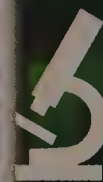
3-D SPREADSHEET



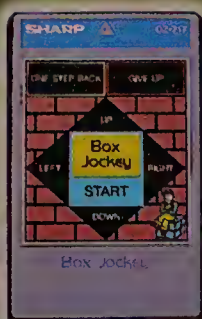
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Letraset's Shapes is a drawing layer for ColorStudio that lets you soften the edges of PostScript graphics.

are blended with the bitmapped portion of the image. With Shapes, the same file can be rendered at different resolutions for a variety of output options. Files can be sent to non-PostScript devices, such as prepress systems, paintbox systems, film recorders, or video paintbox and animation systems such as the Quantel Harry workstation.

Other advantages of Shapes include varying levels of transparency for PostScript objects (translucent type, for example); smooth color blends; and faster printing by pre-rendering complex shapes or blends on a PostScript imagesetter. An auto-trace feature lets you convert graphics from ColorStudio's bitmapped layer into PostScript objects.

In the prerelease version, text couldn't be typed directly in Shapes, but had to be imported as an EPS outline. According to a Letraset representative, either the final version or a forthcoming update will offer the ability to type PostScript text directly.

Shapes will be available in the second quarter of 1990 and will sell for \$295 (free to anyone who purchased ColorStudio before June 1).

—Erfert Fenton

## Deep Contact



Those of you who attended Macworld Expo in San Francisco may have been amused, offended, or otherwise interested by a flyer for Virtual Valerie, a "multimedia sextravaganza" sold on CD ROM for \$95. "You've got a hot date with Val-

erie, your cybernetic fantasy," it teased. "But first, you'll have to find her! You begin on the street in front of her building and take it from there . . . until you meet Virtual Valerie for an erotic interlude!"

At the San Francisco Museum of Modern Art—only two blocks from the Expo hall where Virtual Valerie was for sale—you could have

seen another Mac-based interactive sex fantasy. There, in larger-than-life video, a woman dressed much like Valerie, in black miniskirt, low-cut bodice, and long satin gloves, beckoned to visitors.

"Touch me," she insisted, seductively. "Try and reach through the screen." If you touched her legs on the HyperCard screen, she led you into the garden, where the Woman in Red, the Zen Master, and the Demon appeared and then vanished through the trees. If you touched her hands, you'd be in the bar, where you could choose a character with whom to pursue an erotic fantasy. And if you touched her head, the artist, Lynn Hershman, appeared

to explain the game's intent: to explore the powerful intimacy of mass media, to consider its effect on who we are and the way we desire. (Not to mention what we order on CD ROM.)

Hershman created Deep Contact with a 12-inch interactive videodisc with color and sound, a Sony video projector, a video camera, a Pioneer 6000 videodisc player, a Macintosh IIcx computer, a Microtouch touch-sensitive screen, and a console pedestal. Sara Roberts of Lucasfilm wrote the HyperCard program and the drivers. Deep Contact will travel to New York's

International Center for Photography in 1991 and may travel to France and Canada later. For further information, call Lynn Hershman at 415/398-8055.

—Ann Garrison

## Swivel Goes to Toontown



Bugs Bunny beware: personal computer animation has come of age. Using Paracomp's Swivel 3/D Professional, artists are creating high-quality computer animation for television commercials.

Swivel 3/D Professional is a new version of the three-dimensional modeler Swivel 3/D. Animators use Swivel for functions like linking, which joins objects so they move in relation to each other—useful for objects with moving parts, such as cartoon charac-



Sara Roberts of Lucasfilm (left) wrote the HyperCard scripts for artist Lynn Hershman's interactive sex fantasy.

ters. Animators also like Swivel's tweening, which creates still frames that can be turned into moving sequences in other applications.

Swivel 3/D Professional keeps the interface and functions of the old version, but adds new output formats including 24-bit PICT and AutoCAD DXF, as well as RenderMan, which is emerging as the standard for high-quality shading and texturing (see "Get Realistic," *Macworld*, June 1990). Professional's rendering functions include smooth (Phong) shading, lighting with

(continues)





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up to eight sources, and a material editor that can create color and reflection effects on surfaces. Professional also adds 24-bit full-screen display.

Jim Ludtke, a New York free-lance artist, used Professional to create a 3-D cartoon character in a commercial spot for Nabisco and Nintendo. In the spot, a cartoon Mario brother (from the Nintendo game "Mario Brothers") bounds across the TV screen with a mob of real kids in hot pursuit.

To create the cartoon character, Ludtke drew in Mario's component parts separately and then joined them with Professional's linking feature. Ludtke smooth-shaded Mario with Swivel's plastic material to give the character a fleshy look, and, for a final touch, he used the light panel to illuminate Mario with three light sources, enhancing the 3-D effect.

To animate Mario, Ludtke tweened frames of the character in motion, saved them in the PICS animation file format, and exported them to MacroMind Director 2.0 for sequencing into an animated segment. He then connected his Mac to a Quantel Harry workstation for final editing and export to videotape.

Swivel 3/D Professional lists for \$695. For more information contact Paracomp in San Francisco at 415/956-4091.—Jonathan Cassell



DAVID BARRY

**Jim Ludtke has been known to wear pj's and enjoy the New York skyline while creating animations for network television.**

VideoPaint Professional separates its tools and their attributes so that any tool can be modified almost beyond recognition and its attributes assigned to a different tool. For example, using VideoPaint Professional's incrustation feature and its support for links between documents, you might trace over an oval object in a painting and let a glimmer of another painting show through inside the oval; you could then assign the resulting image to the paintbrush to build up your montage, or convert the degree of incrustation to a filter and use it in some unrelated way.

VideoPaint Professional's programmer Eric Wenger says the new version will match the capabilities of the non-Mac video-titling software Types; support antialiasing, lighting, and RenderMan-like shading (but not RIBS import); and implement an odd selection scheme in which each corner of a selection is a different tool.

Like CA-Cricket Paint's FreshPaint feature, any altered selection in VideoPaint remains live until you deselect it, but unlike FreshPaint, you can use all VideoPaint features on a selection. With VideoPaint's simple macro-recording capability you can save a mask to reselect an area; and tool palettes and other user-defined features can also be saved as macros, in effect making VideoPaint a paint-application generator.

VideoPaint Professional's macros will be upgraded later to make the FreshPaint-like feature obsolete: the ability to automatically convert bitmap images to vectors and to store the vectorizations with time information will give VideoPaint an efficient animation tool that can double as an infinite undo. If you don't like something in a painting, just play it backwards to the point where you got off the track, make a correction, and reapply your later work.

VideoPaint Professional will list for either \$595 or \$695, and upgrades from the current version will be less than \$200. For more information, contact Olduvai in Coral Gables, Florida, at 305/665-4665.—D.L.

## Making Media

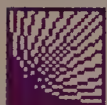


Multimedia is about to get easier. Mixing video footage, CD music, and Mac animation to wow people with impressive presentations and demos sounds great, but doing it—which normally requires scripting in HyperCard—can be a real chore. MacroMind's new MediaMaker

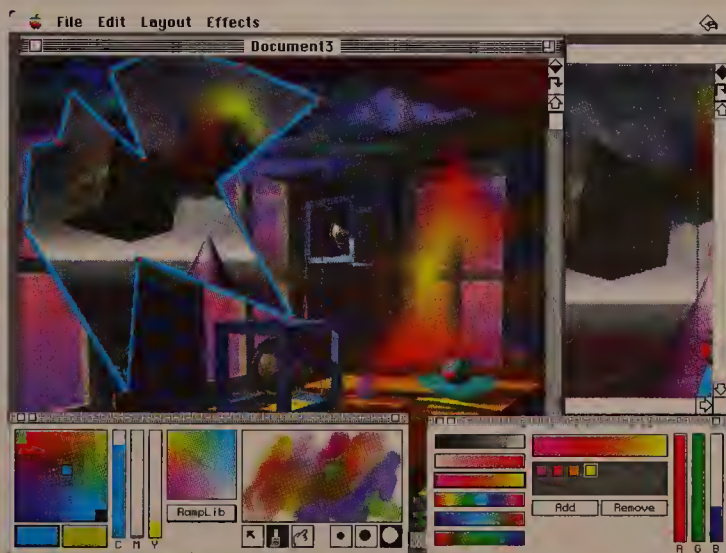
reduces cuing and running all your devices to pushing a few *picons*—picture icons (icons containing images taken from the clip they represent)—about on a time line, almost like previewing slides on a light table.

MediaMaker has two environments. In the Collections environment, you create databases of clips from any device that (continues)

## Object-Oriented Paint



As object-oriented programming (OOP) establishes itself with developers, its modularity and its class-and-inheritance structure are affecting the design and functionality of applications. VideoPaint, which was created in France and first marketed in this country as Graphist-Paint, is being upgraded to a 32-bit program that serves as a good example of an OOA (object-oriented application—pronounced ooh-aah).

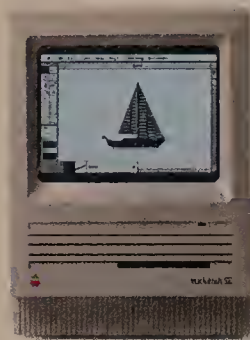


**A hole cut out of one VideoPaint Professional collage can be a window into another image underneath it.**

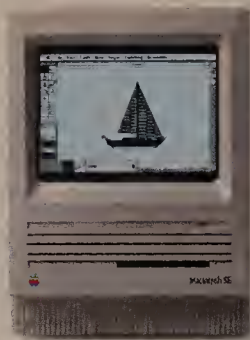


# It's 9:01. And it's do-or-die.

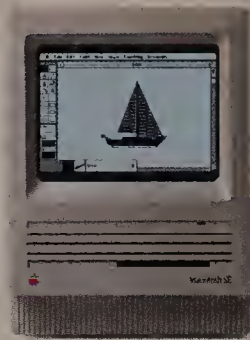
All 5 offices of Venture Vessels have just 10 minutes to finish a presentation. Together.



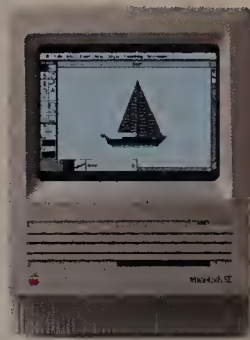
San Francisco



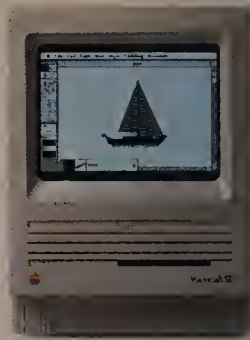
Los Angeles



Newport



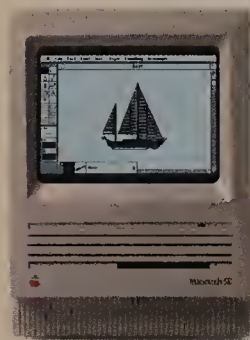
Philadelphia



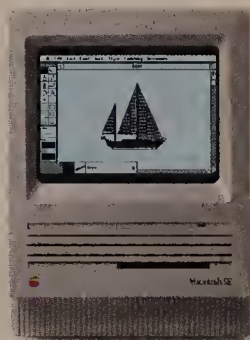
Sydney

## It's 9:05.

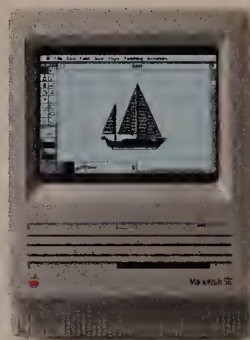
For a moment, things run aground. Philadelphia points out a need for another sail. And, thanks to Aspects, they're able to alter the graphic right there for everyone to see.



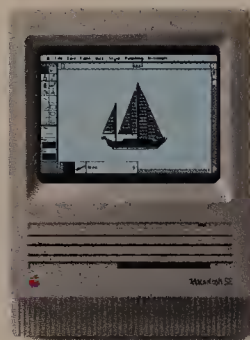
San Francisco



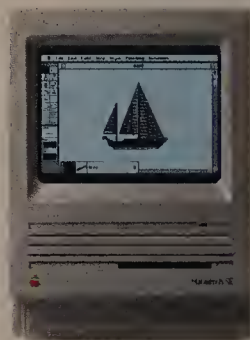
Los Angeles



Newport



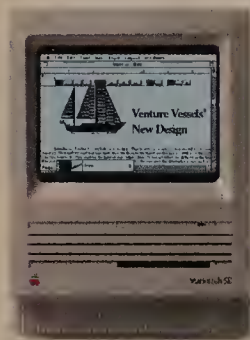
Philadelphia



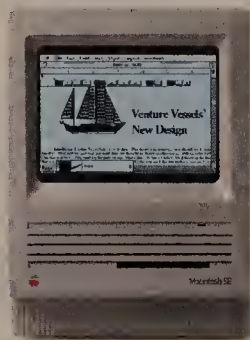
Sydney

## It's 9:10.

The conference breezes right along with text contributions made together by San Francisco, Los Angeles and Newport. And everybody agrees—the presentation is ready to set sail.



San Francisco



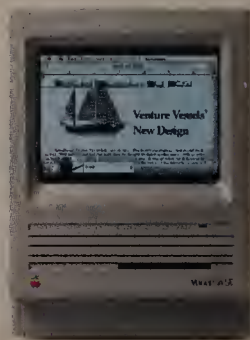
Los Angeles



Newport



Philadelphia



Sydney

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has a Mac driver (as well as native Mac files such as sounds, PICT files, and MacroMind Director animations), assign them to picons, and give each a text description. (The first version of MediaMaker can't search the text file but a later version will be able to.) MediaMaker provides tools for each format, for example, letting you advance a laser disc one frame at a time to mark exactly where you want a clip to begin.

In the Sequencer environment, you grab picons from collections and lay them out along a timeline. Each format has its own line, so a video picon can launch a laser-disc player at the same moment a sound picon starts a CD player. Picons contain only information about where a clip starts and stops or where a file is on your hard disk, so collections take up little disk space and can be created and sequenced on a Mac Plus or SE. Complete sequences can be played and written out to a video cassette.

MediaMaker is simple to understand and to use. It lacks special effects and editing tools like the Avid workstation or other time-domain editing systems, and cannot run outside applications that might be useful such as ScreenRecorder or HyperCard (later versions may have this ability;



**ClearScan Color is a hand-held scanner that supports 512 colors and can merge several swaths into one image.**

ROBERT CARDIN

for now, it can call XCMDs or Director Xobjects for that purpose). It has only a bare minimum of user-definable events like waiting for a mouse-click or pausing for a specified period.

MediaMaker should ship in September and will probably list for \$395 or \$495. For more information, contact MacroMind in San Francisco at 415/442-0200.—D.L.

## Color in the Palm of Your Hand



The first hand-held color scanner, the ClearScan Color from NCL America, has a palette of 512 colors and a resolution of 300 dpi. The ClearScan Color scans images in swaths that measure 2½

inches wide by 5 inches long. The scanner comes with a utility that helps merge several swaths into a single image. To help match the edges of the swaths, the software can enlarge the images while you're overlapping and merging them.

Although the palette contains 512 colors, the device stores the scanned image as a PICT2 file with 256 colors. Included edit-

ing software lets you rotate images, adjust the contrast, use special effects, or convert images from color to gray scale.

With a suggested list price of \$795, the device is not intended as a replacement for a flatbed scanner in high-use applications, but as a low-cost solution for the occasional or beginning user. The ClearScan Color was slated to ship in July. For more information, contact NCL America at 408/734-1006 or 800/521-0121.—T.M.

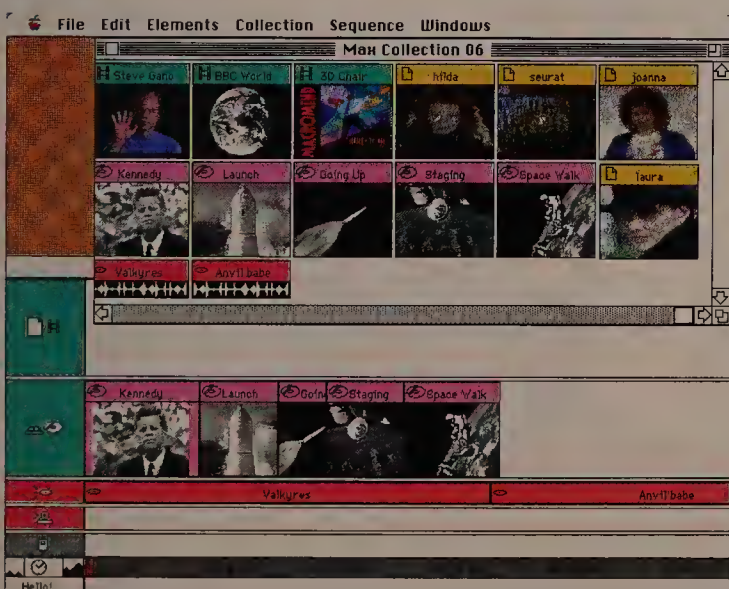
## Musings on Natural Language



How people think about information and how computers operate on data are converging in a new area called natural language (NL) processing. Muse, the first natural-language application for the Macintosh, integrates relational database, spreadsheet, and graphing tools behind an interface that can interpret and execute typed requests like "compare and graph longevity in New England and the Deep South."

In the above example, Muse would search through your data files for census information, extract figures for the appropriate states, build a table, and then draw an appropriate graph, such as a bar chart. If your query were a bit more complex—for example, if you ask it to chart changes in longevity for the past 100 years—Muse would know to generate a 3-D graph or an animated bar chart.

The principles underlying earlier NL applications written for mainframes, as well as Muse, are based on the branch of linguistics called transformational-generative grammar. Because natural language, unlike the procedural languages native to computers, is inherently not calculable, natural language must be interpreted in the application's deep structure as calculable or algorithmic procedures, such as Boolean operators, lists, or arrays. Muse comes with several hundred transformational rules for converting between natural language and the underlying metalanguage, and this rule set is stored in an external database, making it possible for



**Arranging bits and pieces of music, video, and other kinds of data on a time line in preparation for a presentation.**



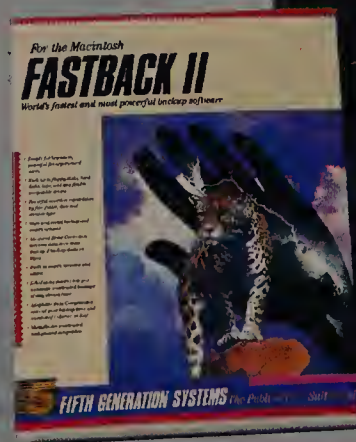
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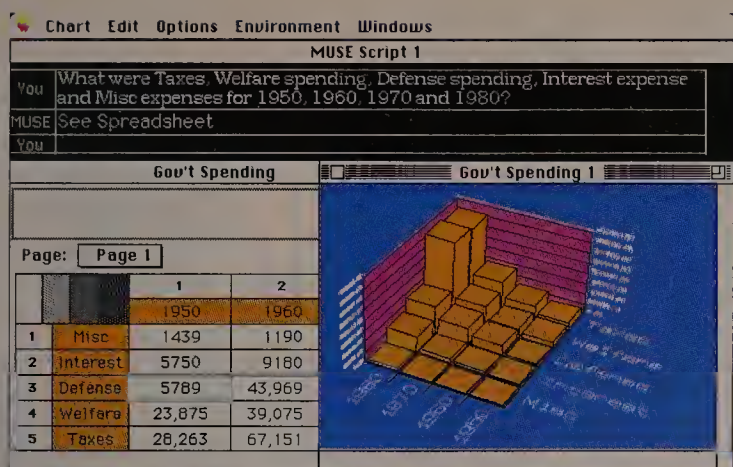


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Muse understands the natural-language query in the top window, compiles a table, and creates a 3-D graph.

end users to add rules. For example, you can teach Muse what South America means by giving it a list of all the countries in that continent.

Muse queries can be saved as scripts and reused, so it is possible to build complete (though uncompiled) applications such as executive information systems, and Muse will present a dialog box whenever it needs the user to provide a variable, such as a search criterion. Occam Research says Muse's query language eliminates the need for standard Mac interface objects like buttons and menus in a custom database, though the company may add support for them anyway.

Future plans for Muse include a multiuser database, CL/1 compatibility, and speech recognition. Muse will be available to MIS departments and VARs in October and will go into general distribution in January at \$695. For more information, contact Occam Research in Watertown, Massachusetts, at 617/923-3545.—D.L.

## I Want My Mac TV



RadiusTV, a peripheral that displays full-function television on the Mac II series, provides an image as large as 640 by 480 pixels on monitors up to 19 inches in diameter. Radius designed the RadiusTV as an external box so that it could incorporate a cable-ready TV tuner, real-time digitizer logic, and five interfaces to video sources. The interfaces include two RF connectors that can each accept a signal from a VCR, two composite video inputs, and one RGB channel that supports high-quality video devices, such as CCD cameras.

A high-speed cable links the external box to the RadiusTV's NuBus board inside the Mac.

RadiusTV supports 16 bits of color, about one bit less than the bandwidth of broadcast TV, but not enough less for the average viewer to notice the difference. It works with Radius

24-bit color adapter boards, which support the NuBus's high-speed block-transfer mode. Radius says there is nothing to prevent RadiusTV from working optimally with other 24-bit boards that support block-transfer mode. At press time, Raster-Ops Corporation had just announced the 8L Display Board and 24L Display Board, both of which support block transfer. Other display vendors are also working on 24-bit boards with block-transfer capability. RadiusTV

That information can be captions for the hearing impaired or ticker-tape data from CNN, for example.

The suggested retail price for RadiusTV will be under \$3000, according to Radius. The company expected to begin shipping in June. For more information, contact Radius in San Jose, California, at 408/434-1010.—T.M.

## MapInfo to Chart New Territory



Software developers have taken advantage of the Macintosh's visual interface to simplify most kinds of computing tasks, but, curiously, mapping and manipulating geographical information—certainly one of the most inherently visual tasks a computer could be asked to perform—has been slow to take off on the Macintosh. That is beginning to change.

MapInfo, known for its DOS product of the same name, is developing a



Intended for video production, the RadiusTV external subsystem puts a 16-bit, full-motion TV window on a Mac II monitor and accepts input from a variety of video sources.

can function at a lower level with 8-bit boards.

RadiusTV's interface has all the usual TV controls plus autocalibration. Users can store RadiusTV images as PICT2 files. The sound is also digitized for storage. The device can capture and store as a text file any closed-caption information in the TV signal.

Mac version of MapInfo that, as company president Sean O'Sullivan describes it, is "a surface to databases." It is not a map-drawing package but instead a geographical information system (GIS), a tool for displaying and comparing information across a geographical area. For example, AT&T (continues)



# A MAJOR PRODUCTION

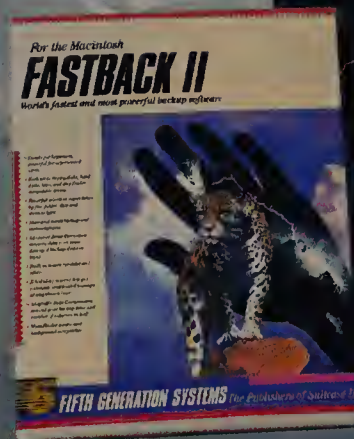
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Which turns a major production into a very short subject.

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uses MapInfo in its Call before You Dig program to provide exact descriptions of where not to dig based on surface features such as addresses, sewer holes, and road signs, and neurologists at Johns Hopkins University are even using MapInfo to map nerve pathways in the brain as they conduct tests with implanted electrodes.

MapInfo has three linked views into its information. Like any database,

## Survey: High Expectations for Low-End Mac



This month's survey, which was mailed to 1000 subscribers, examines *Macworld* readers' expectations for the much-anticipated low-cost Mac. The survey, which 47.5 percent of our survey group responded to, indicates that the Macintosh community would be extremely receptive to a new inexpensive Macintosh.

A whopping 42.6 percent said that if the low-cost Mac met their expectations they would be extremely likely to buy it despite the fact that most of the respondents already own Macs. Another 21.7 percent said they would be very likely to buy the low-cost Mac. Other respondents were not so enthusiastic, with 19.6 percent saying they would be only somewhat likely to buy, and

15.1 percent responding that they would not be likely to buy.

As for what our readers expect from a low-cost Mac, 49.4 percent said they expect the price to be from \$500 to \$999—less than the list price of a Macintosh Plus; 25.5 percent said they


expect the price to be between \$1000 and \$1249; and 16.6 percent expect the price to be in the \$1250 to \$1499 range.

When asked how much memory they expected in the low-cost Mac, 39.4 percent said 1MB. Almost as many, 37.4 percent, said 2MB—indicating that many of our readers want the new Macintosh to be able to run System 7.0 with no memory upgrade (System 7.0 will require a minimum of 2MB). Only 14.3 percent said they expected 2.5MB.

As for the microprocessor, 43.2 percent said they expect a 68020 (the processor used in a Mac II), 29.4 percent said a 68000 (the processor used in a Mac Plus), and 25.5 percent said a 68030 (the processor used in the Mac IICx, IICi, and IIfx).

In the storage department, an overwhelming majority—77.4 percent—said they expected the low-cost Mac to be able to accommodate an internal hard disk. Most respondents did not expect the low-cost Mac to include a color display, with 57.2 percent saying they expect a black-and-white display, 28.3 percent saying gray scale, and only 14.3 percent saying color.

Finally, a slight majority said the low-cost Mac should not be modular—that is, should not have a separate system chassis and monitor—with 52.6 percent saying it should not, and 46.4 percent saying it should.

—Jonathan Cassell 

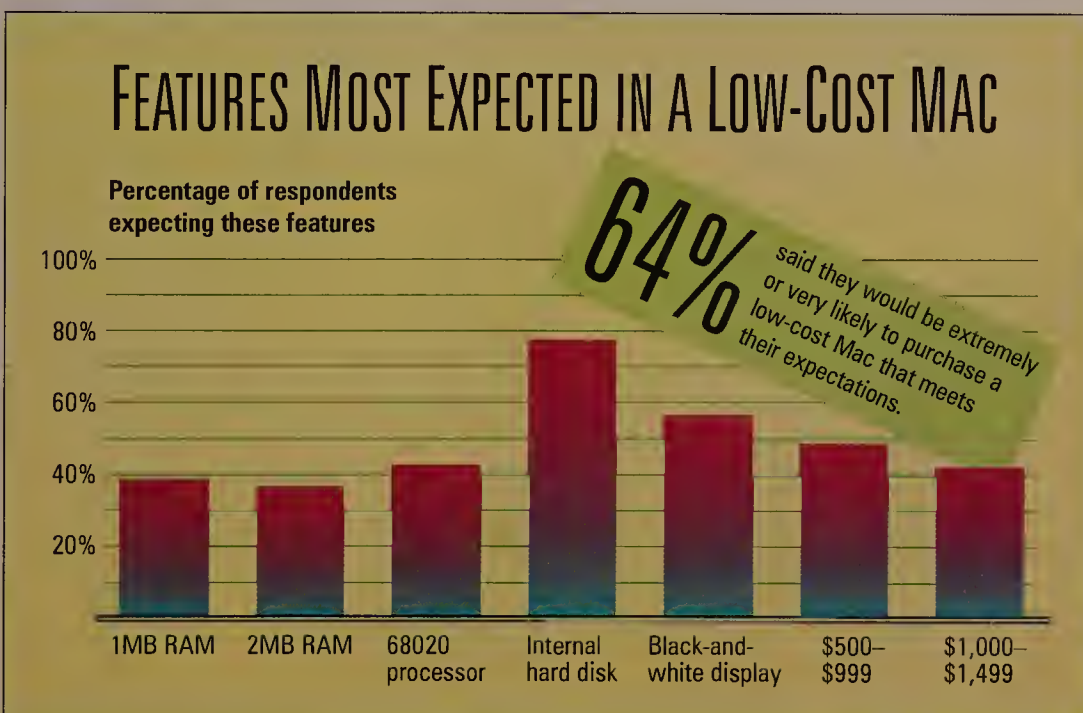


Yvonne Leary uses MapInfo on a PC clone to match up Kansas City commuters who want to arrange car pools.

you can study, enter, or modify raw data in the browse view; in the map view you study and manipulate maps and information overlaid on them by your queries; and in the graph view the same data appears in bar charts and other formats. MapInfo can also read native-format FoxBase+/Mac and Microsoft Excel.

MapInfo's database engine is SQL, shielded with a friendly interface that provides excellent query tools and simplifies accessing data in larger databases and spreadsheets. It provides a query dialog box for simple queries and a second dialog box for complex queries—in the second dialog box, you can access the SQL code directly if you want to. MapInfo's SQL has an extended command set appropriate for geographical queries including **within**, **proximity**, and **perimeter**. MapInfo also supports entering topological data with a scanner and aligning it with maps.

MapInfo will list for \$695. For more information, contact MapInfo in Troy, New York, at 518/274-8673.—D.L.



In this month's survey 64 percent of responding readers said they would be either very likely or extremely likely to buy a low-cost Mac that met their expectations.



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2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, IIfx, IIfx, or SE30 to this amount of memory	Do this: (Install in multiples of four only)
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
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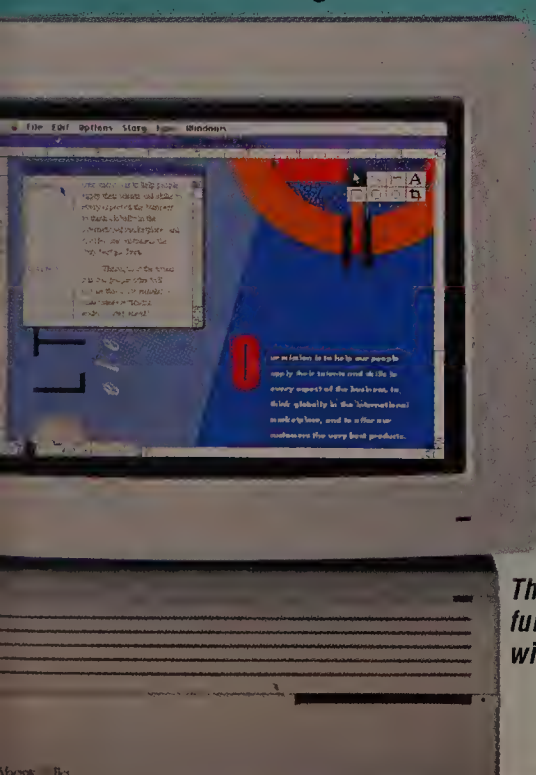
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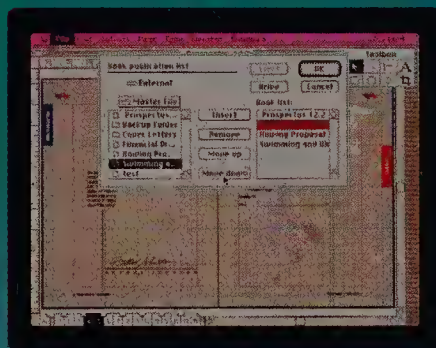
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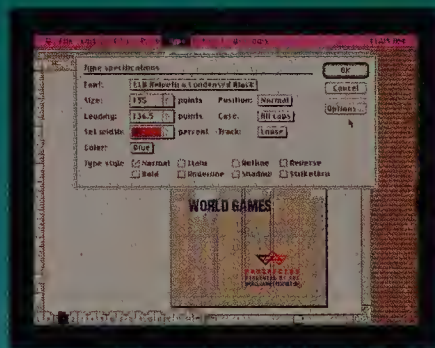
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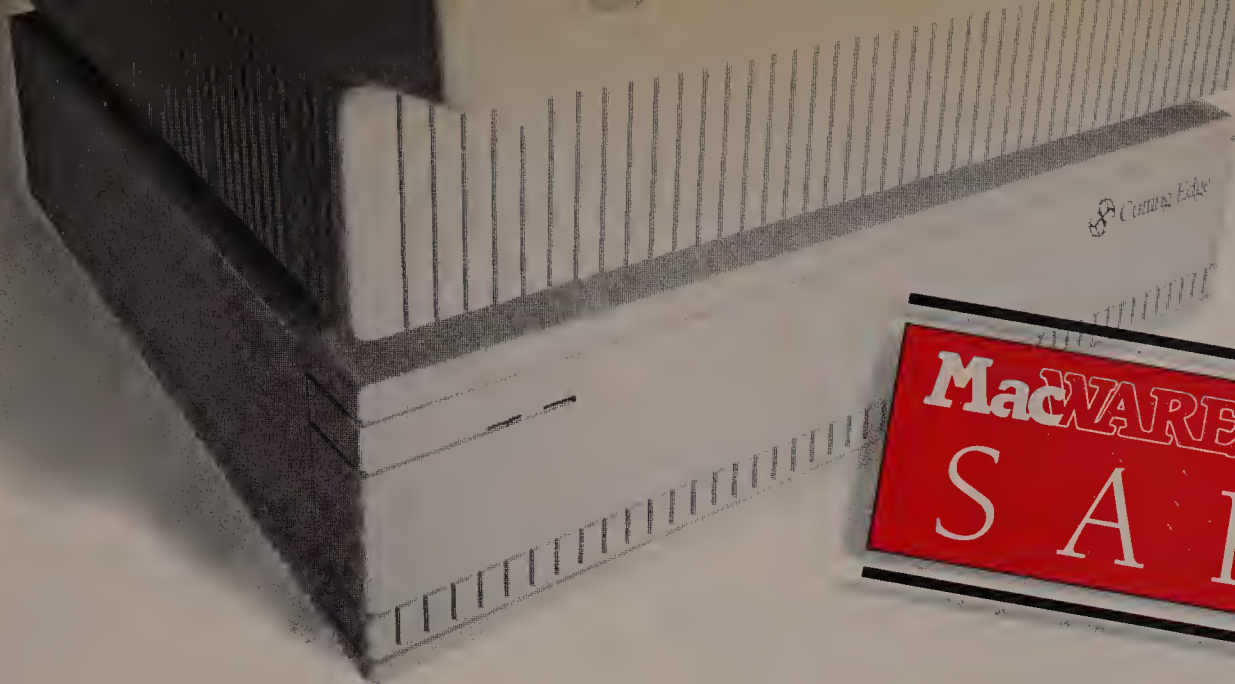
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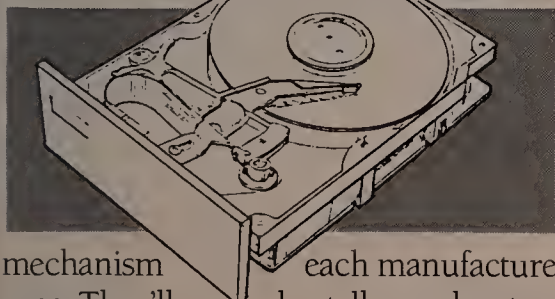
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Savings are calculated from MacWarehouse December 1989 published prices. \*Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for \$75 \*\*PLI is a 50meg turbo drive. \*\*\*40+ meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

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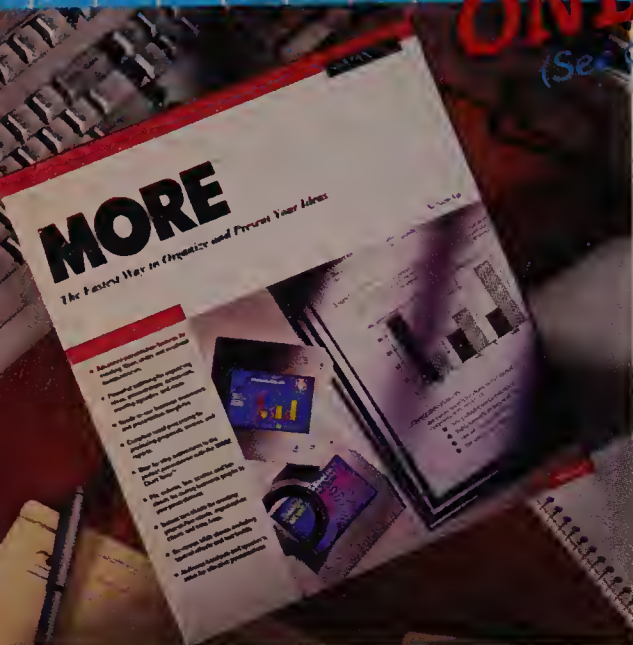
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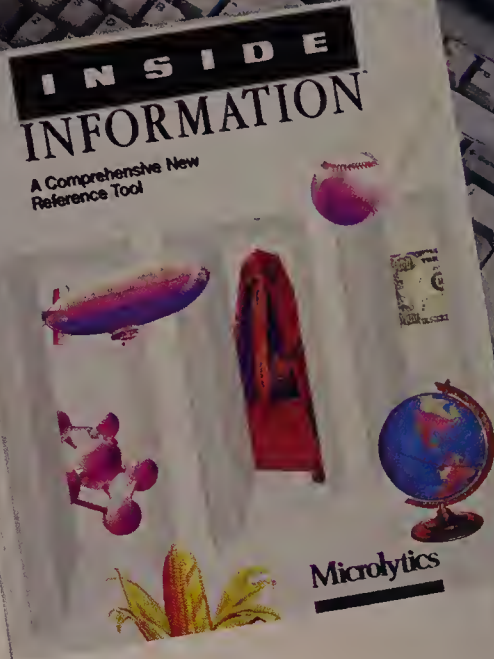
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110 SE UPS .....	219.
370 ci UPS .....	349.
<b>Basic Needs, Inc.</b>	
HardCovers Keyboard Covers .....	15.
HardCovers ImageWriter .....	17.
Keyboard Flip .....	6.
Dust Covers - Grey Nylon Ripstop	
Mac Plus and keyboard .....	11.
Mac SE & extd. or reg. keyboard .....	11.
Mac II and extd. keyboard .....	12.
Mac IIcx/ci Monitor Stand .....	40.
Universal Laser Printer Stand .....	28.
Utility Pac .....	11.
<b>Computer Giftware</b>	
Mouse Pads .....	starting at 12.
<b>Curtis</b>	
Command Center .....	89.
Computer Tool Kit (52 pc.) .....	49.
<b>Ergotron</b>	
MacTilt-SE .....	68.
MacTilt II-RGB .....	75.
<b>I/O Designs</b>	
Imageware II Carrying Case .....	49.
Macinware IIcx Carrying Case .....	85.
Macinware Mac II Carrying Case .....	99.
Macinware Plus Carrying Case .....	64.
Macinware SE Carrying Case .....	75.
Monitorware Apple RGB Case .....	79.
The Ultimate SE Carrying Case .....	79.
The Ultimate Neon Carrying Case .....	89.
<b>Kensington</b>	
Anti-Glare Filter .....	33.
Apple Security System .....	34.
LaserWriter II Security System .....	32.
MasterPiece Mac II .....	105.
PowerBacker 360 UPS Line .....	269.
PowerBacker 800 UPS Line .....	749.

SE Radiation Shield .....	54.
System Saver Mac .....	63.
<b>Mobius Products</b>	
Fanny Mac QT .....	55.
SE Silencer .....	39.
<b>Targus, Ltd.</b>	
Deluxe Plus/SE-XKB Case (black) ....	69.
ImageWriter II Case (black) .....	45.
Mac Plus/SE Case (black) .....	55.
IIcx/IIci Case .....	75.
Premier Leather Case .....	175.



**Mouse Pads (Computer Giftware)**  
For sophistication during hours - and excitement after! **Executive Pads** put the elegance of marble on your desk. These pads look like the real thing but only your mouse knows for sure! Choose from White Italian Marble, Green Marble, Granite, and even Kentucky Burlwood. **\$12.** After the grind why not invite a Bikini-clad California Girl or Volley Ball Hunk over to your

**Bachelor or Bachelorette Pad? \$13.** The truly daring may even opt for an exciting adventure with **Indiana Jones. \$15.** (accessories)

## ACCOUNTING & PERSONAL FINANCES

<b>Aatrix</b>	
Checkwriter II 2.8 .....	37.
Payroll 3.5 .....	109.
Payroll PLUS or TimeMinder .....	175.
<b>Absolute Solutions</b>	
Computerized Classic Accounting ..	225.

**Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus)**  
Pamper your Mac with a Targus case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens. (accessories) **\$69. Full line available.**

**ATLAS\*MapMaker Version 4.5 (Strategic Mapping, Inc.)**  
Put your business on the map! ATLAS\*Mapmaker 4.5 quickly displays hidden relationships in geographic data with striking color graphics. Includes everything you need to map the U.S. & the world by a wide variety of criteria. Import your own data or use the U.S. Census statistics included. Use ATLAS\*MapMaker to read ZIP-coded "name and address" files, then aggregate their data into essential information for target marketing and more. (graphics) **\$295.**



<b>Nolo Press</b>	
For The Record .....	29.
WillMaker .....	32.
<b>Reality Technologies</b>	
Wealthbuilder .....	165.
<b>Survivor</b>	
MacMoney 3.5 .....	59.

## BLANK MEDIA

<b>B.A.S.F. made in U.S.A</b>	
DS/DD (box of 10) .....	14.
DS/High Density (1.44 Meg) .....	24.
<b>Sony</b>	
DS/DD (box of 10) .....	13.
DS/HD (1.44 mb) .....	24.

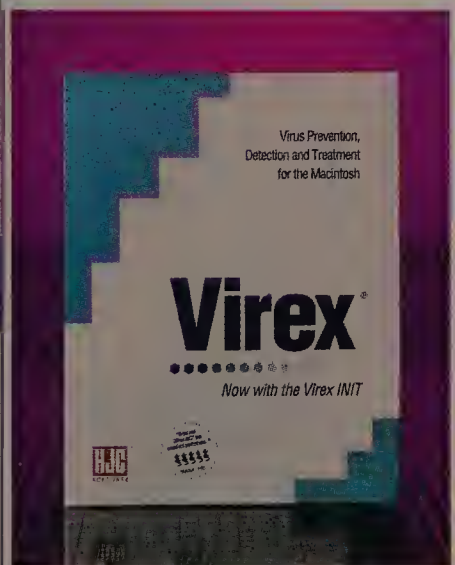
## BUSINESS & PRESENTATION

<b>A Lasting Impression</b>	
ResumExpert (word vers.) .....	39.
Cover Letters or Students .....	ea. 39.
Managers or Sales & Marketing ..	ea. 39.
Healthcare or Finance & Banking ..	ea. 39.
Education or Arts & Leisure .....	ea. 39.
Comp. Sciences & Engineering .....	39.
<b>AEC Management Systems</b>	
FastTrack Schedule 1.5 .....	139.
<b>Aldus</b>	
Persuasion 2.0 .....	329.
<b>Claris</b>	
MacProject II .....	365.
SmartForm Designer w/Assistant ..	289.



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<b>Deltapoint</b>	
Delta Graph 1.5 .....	97.
<b>Imagine That!</b>	
Extend .....	339.
<b>Informix</b>	
WingZ 1.1 .....	245.
<b>Kaetron</b>	
Top Down 2.0 .....	199.
<b>Mainstay</b>	
MacSCHEDULE .....	127.
<b>Microsoft</b>	
Excel 2.2 or PowerPoint 2.1 .....	ea.245.
The Microsoft Office .....	525.
The Microsoft Office-CD .....	669.
Works 2.0 .....	179.
<b>Portfolio Systems</b>	
Dynodex-w binder & paper .....	57.
Paper .....	14.
<b>Power Up</b>	
Address Book Plus .....	53.
Address Book Plus w/Binder .....	99.
Calendar Creator .....	38.
FastForms! .....	89.
Letter Writer Plus .....	53.
<b>Preferred Publishers</b>	
Direct Mail .....	54.
<b>Satori</b>	
Bulk Mailer .....	75.
<b>Shana Enterprises</b>	
Informed Designer .....	167.



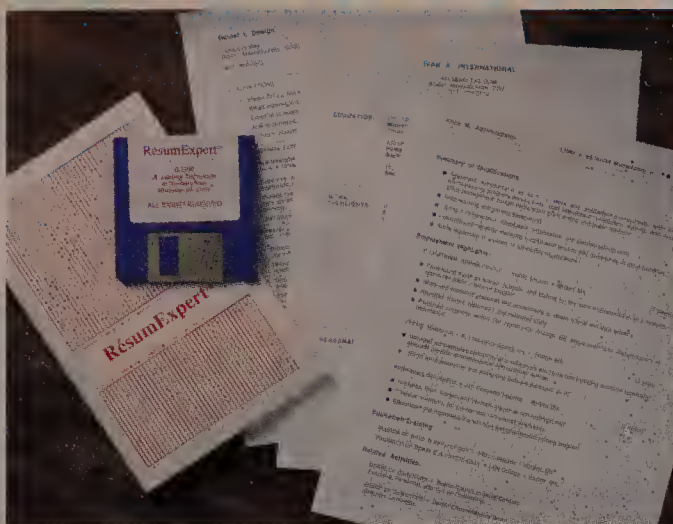
**Virex 2.7 (HJC/Microcom)**  
Immunize your Mac against deadly computer viruses! Just give the command and Virex with The Virex INIT is on duty monitoring your Mac to prevent infection from all known Mac viruses. Use Virex's Record/Scan feature to identify previously unknown viruses. Once diagnosed, order Virex to operate and repair files like a skilled surgeon. Rapid upgrades stop new virus strains in their tracks. Registered users receive update notices and have access to publisher's Toll-free Virex Help Hotline. (virus protection) **\$56.**

<b>Softstream International</b>	
Endeavour Planner .....	95.
<b>Symantec</b>	
More 3.0 .....	265.
<b>Symmetry</b>	
KeyPlan .....	275.
<b>SYNEX</b>	
MacEnvelope 5.0 .....	57.
MacEnvelope Plus .....	159.
MacPhonebook .....	51.
<b>Vertical Solutions</b>	
FastLabel 2.0 .....	89.
FastEnvelope .....	50.
<b>Zedcor</b>	
DeskWorks .....	229.

## CAD/CAE

<b>Clarix</b>	
ClarixCAD .....	579.
<b>Graphsoft</b>	
Blueprint .....	219.
MiniCad+3.0 .....	519.
<b>Innovative Data Design</b>	
MacDraft 2.0 .....	195.
<b>Strata</b>	
StrataVision 3D .....	375.

**ResumExpert (A Lasting Impression)**  
Whether you're seeking an entry-level position or an executive's corner office, the ResumExpert Software Series is the next best thing to knowing the boss. Professionally written and fully-formatted Microsoft Word templates let you easily create eye-catching resumes. MacUser 10/89 awarded ResumExpert 4 mice and raved about the "excellent manual" that includes expert writing tips. MacUser 12/89 rated it as one of the Top 200 Software Programs of



1989. See line listings for all 10 editions. (business) **\$39. each**

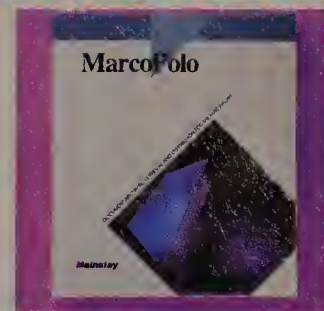
## COMMUNICATIONS & NETWORKING

<b>CE Software</b>	
In/Out (1 to 5 Users) .....	128.
QuickMail 2.2 (1-10 Users) .....	315.
<b>CompuServe</b>	
CompuServe Navigator 3.0 .....	49.
CompuServe Subscription Kit .....	23.
<b>DataVIZ</b>	
MacLink Plus w/Cable .....	119.
MacLink Plus/Translators .....	99.
<b>Dove</b>	
FastNet SCSI .....	749.
FastNet III SE or SE/30 .....	ea. 375.
<b>Dow Jones</b>	
News/Retrieval Membership .....	24.
<b>Farallon</b>	
MediaTracks .....	189.
PhoneNET Connector 10 Pack .....	249.
PhoneNET Repeater .....	329.
PhoneNET Star Controller .....	825.
Timbuktu 3.1 .....	95.
Timbuktu Remote .....	123.
TrafficWatch .....	125.
<b>FreeSoft</b>	
White Knight 11.0 .....	85.
<b>Infosphere</b>	
Liaison .....	175.
<b>InSignia Solutions</b>	
Soft PC (Mac II) .....	245.
<b>Microcom Software</b>	
Carbon Copy Mac .....	119.
<b>Prodigy</b>	
Mac Starter Kit .....	27.

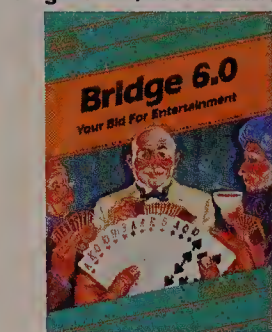
<b>Prometheus</b>	
MacKNOWLEDGE .....	85.
<b>Shiva</b>	
DOS Dial-In or CONNECT .....	ea. 69.
<b>Software Ventures</b>	
Microphone II v.3.0 .....	215.
<b>Solutions</b>	
FaxGate Plus .....	239.
MailMaker (5-Pack) .....	117.
<b>TOPS</b>	
InBox Plus 3.0 .....	1299.
NetPrint or Repeater .....	119.
FlashCard .....	155.
TOPS 3.0 Network Bundle .....	187.
TOPS DOS Network Bundle .....	165.
<b>Traveling Software</b>	
Lap-Link III Connectivity Pac .....	119.
Lap-Link III Network Pac .....	185.

## DATABASE SOFTWARE

<b>Acius</b>	
4th Dimension 2.0 .....	465.
FileForce .....	249.
<b>AEC Management Systems</b>	
AEC Information Manager .....	409.
<b>Blyth</b>	
Omnis 5 .....	429.
<b>Clarix</b>	
FileMaker Pro .....	219.
<b>Fox Software</b>	
FoxBASE+/Mac .....	292.
<b>Odesta</b>	
Double Helix III .....	389.
GeoQuery .....	229.
<b>ProVUE</b>	
Panorama .....	249.



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Membership package comes with E-Z Online communications software, provides the new user with **5 hours of free online time.** Connects with more than 50 databases, up-to-the-minute news and financial data, plus extensive reference library. (communications) **\$24.**



**New! The ProModem 2400Minifax**  
The Minifax is a 9600 bps, send-only fax and a 2400bps data modem. Send Mac documents directly to any Group III fax machine in the world, or use it as a 2400 bps data modem for connecting to online services, sending Email or transferring files. Includes new fax software, Maxfax, MacKNOWLEDGE, and a Mac cable. (modems/fax) **\$209.**

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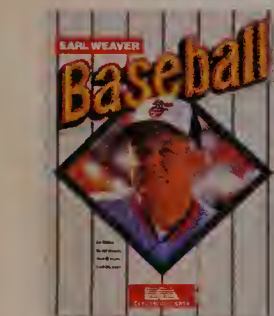


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## MacPrint

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## Hard Covers

Hardtop printer and keyboard covers made from high impact ABS plastic fit right on your keyboard or printer to provide solid protection against dust and spills. Guards against damage while in transit. (accessories) **Starting at \$15.**

## DESK ACCESSORIES

<b>Casady &amp; Greene</b>	
QuickDEX .....	31.
<b>Dubi-Click</b>	
Calculator Construction Set v. 2.0 .....	45.
<b>JAM Software</b>	
Smart Alarms & Appt. Diary .....	64.
Smart Alarms (1 - 4 users) .....	125.
Smart Alarms (5 - 8 users) .....	189.
Smart Alarms (9 - 15 users) .....	249.
Smart Alarms (16-25 users) .....	375.
<b>Microlytics</b>	
Inside Information .....	69.
<b>Preferred Publishers</b>	
Database 1.5 .....	68.
Vantage 1.5 .....	52.
<b>Solutions</b>	
SmartScrap & The Clipper 2.0 .....	45.
<b>Vision Software</b>	
Form Layout .....	35.



## Personal Press (Silicon Beach)

Personal Press creates professional layouts for you. Forget the long, steep learning curve, because Personal Press has AutoCreate to assemble stories and graphics into templates. It includes a full-featured word processor with spelling checker and thesaurus, controls for scanned images, spot color separations, posted notes, link navigator, extensive page previewing, and on-line help. (desktop publishing) **\$199.**

## DESKTOP PUBLISHING

<b>Aldus</b>	
PageMaker 4.0 .....	499.
PrePrint .....	345.
<b>Data Translation</b>	
PhotoMac .....	609.
<b>Letraset</b>	
ColorStudio .....	1,579.
FontStudio .....	459.
ImageStudio or Ready, Set, Go! .....	275.
<b>OLDUVAI</b>	
Read-It! 2.1 (OCR) .....	278.
Read-It! Personal 2.0 .....	139.
Read-It! TS (ThunderScan) .....	79.
<b>Quark</b>	
QuarkStyle .....	169.
XPress 2.12 .....	469.
XPress 3.0 .....	519.
<b>Silicon Beach</b>	
Personal Press .....	199.
<b>Spinnaker</b>	
PLUS 2.0 .....	115.
Springboard Publisher II .....	109.
<b>TimeWorks</b>	
Publish-It! Easy .....	113.

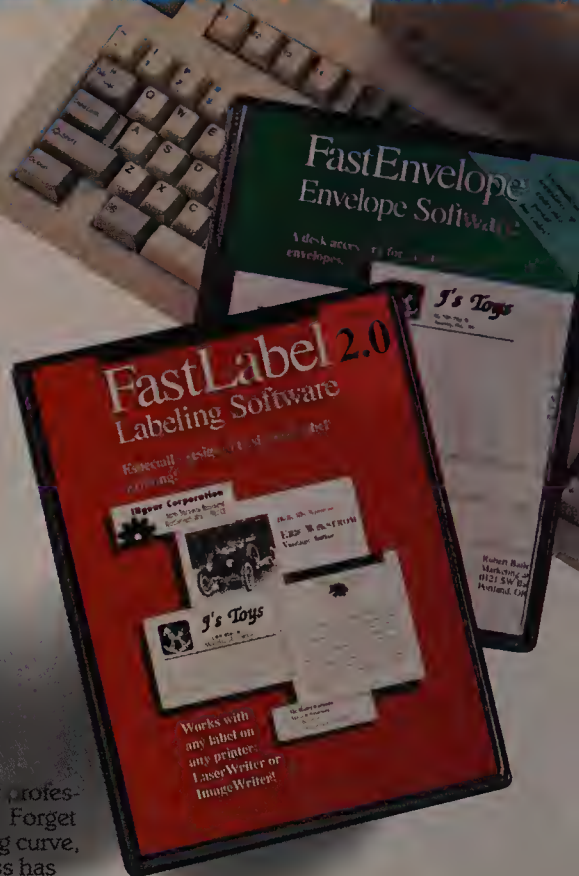
## DISK DRIVES/BOARDS

<b>CMS</b>	
MacStack 20 Meg .....	429.
MacStack 30 Meg .....	499.
MacStack 45 Meg .....	589.
MacStack 60 Meg .....	649.
MacStack 80 Meg .....	769.
MacStack 44 Meg Removable .....	839.
<b>Cutting Edge</b>	
800K External Floppy Drive .....	149.
SyQuest Removable 45 Meg .....	699.
Under the Mac 20 Meg .....	309.
Under the Mac 30+ Meg .....	379.
Under the Mac 45+ Meg .....	435.
Under the Mac 60+ Meg .....	469.
Under the Mac 80+ Meg .....	529.
<b>Dayna Communications</b>	
Dayna File Single 360K (5 1/4") .....	525.

## FastLabel 2.0 (Vertical Solutions)

Stick it to the chore of simple label printing in three easy steps! Import addresses, lists and graphics, then use FastLabel's preformatted templates (or create your own) to produce everything from disk, V.C.R. and cassette labels to name badges, signs and more. (business) **\$89**

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## RasterOps

RasterOps Colorboard 264 ..... 699.

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GEMS of the Word ..... 25.

### BrightStar

Alphabet Blocks ..... 30.

Talking Tiles ..... 26.

### Davidson

Math Blaster or Speed Reader ..... 26.

### Fair Tide Technologies

Navigate! mono. .... 199.

### Learning Company

Math Rabbit or Reader Rabbit ..... ea. 30.

### Nordic Software (full line available)

MacKids Preschool Pack ..... 35.

### Penton Overseas

VocabuLearn French, Spanish, German, Italian, Russian, or Hebrew ..... ea. 35.

VocabuLearn Japanese ..... 35.

### Voice & Video Instruction Videos

HyperCard or Pagemaker 3.0 ..... ea. 35.

Word 4.0 Video Tape ..... 35.

## ENTERTAINMENT

### Artworx

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Daily Double Horse Racing ..... 19.

### Broderbund

Ancient Art of War At Sea ..... 27.

Shufflepuck Cafe ..... 24.

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## The Ultimate Neon SE Carrying Case (I/O Design)

Here's the latest in fashionable outerware for the active Macintosh. It's the NEW "Neon Ultimate" SE in fluorescent green, hot pink and brilliant yellow neon accents! Pamper and protect your Plus or SE with its high density foam padding & durable DuPont Cordura nylon exterior. Secure all your peripherals in its roomy padded inner compartments & two exterior pockets. **FREE** matching disk wallet with every purchase while supplies last. (accessories) **\$9.**

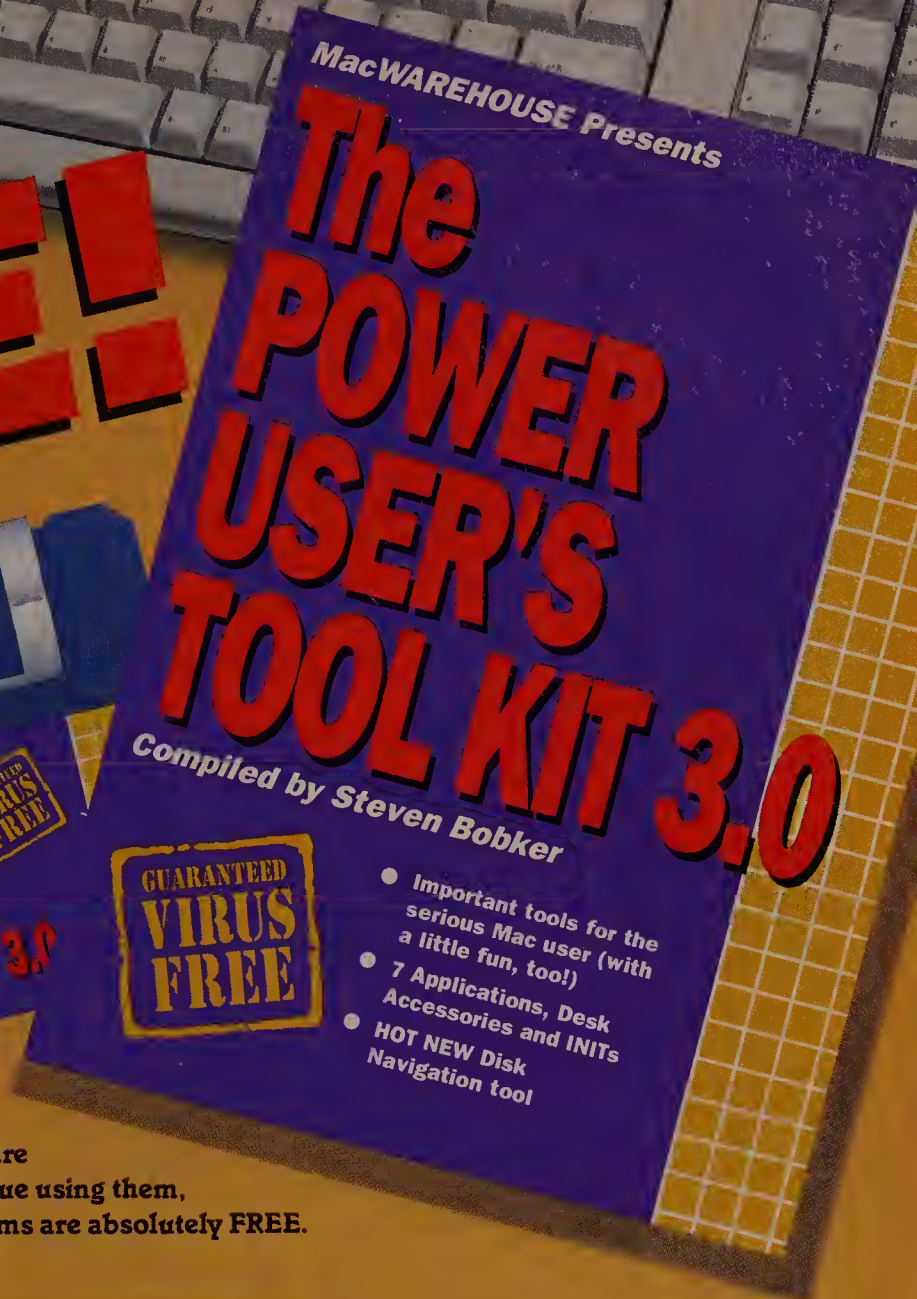
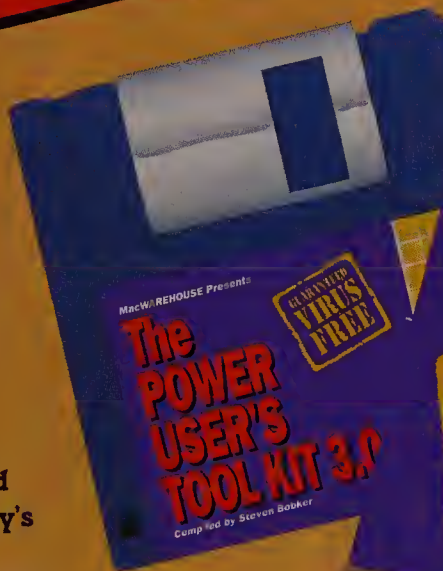


# FREE!

The new 3.0 edition of the popular Power User's Tool Kit includes BOOMERANG 2.0, an ingenious utility, which makes it much easier to use the SF Dialog (the dialog box that appears when you choose Open or Save from the file menu).

You'll also find the latest version of DISINFECTANT (anti-viral freeware) and REMEMBER?, a handy reminder of the day's events when you start up your Mac.

The POWER USER'S TOOL KIT 3.0 is FREE from MacWAREHOUSE when you order from us. If you want the disk, you pay only \$1.50 for shipping and handling. The programs are shareware, so you can try them free of charge. If you wish to continue using them, some authors ask that you pay a fee (\$10-\$35). Many of the programs are absolutely FREE. All of the details are explained on the disk, which is yours to keep.



### LAST CHANCE TO WIN A TRIP TO LONDON!

There's still time to enter our latest contest and win an all-expenses-paid trip to the MacUser U.K. Show in London, November 7-10, 1990. Your name is automatically entered in to the drawing when you order from MacWAREHOUSE. Or, just fill out and mail the entry coupon below.

### Freedom of Press 2.4 (Custom Applications, Inc.)

New, updated Freedom of Press allows Printing of PostScript language files on any of over 50 different printers and film recorders. In combination with your favorite desktop publishing, graphics, drawing, painting and word processing software, Freedom of Press allows you to print PostScript language files, including support for 24 bit continuous tone color images. Complete with 35 scalable and rotatable outline fonts and drivers for all supported printers. Requires Macintosh SE30, II, IIfx, IIfx or IIfx (utilities) \$255.



### MediaTracks (Farallon)

MediaTracks lets you record whatever takes place on your screen so your audience can watch "tapes" of that activity just as it appeared. MediaTracks comes with a full set of tools for editing and annotating tapes. Use it in conjunction with MacRecorder to add clarifying narration. No more need to waste time repeating instructions, just tape a common procedure once, and let people watch it at their convenience. (communications) \$189.

### DeltaGraph 1.5 (DeltaPoint)

Chart a course for success with new DeltaGraph 1.5! This powerful 2 and 3-D full color charting program delivers everything you'll need to create professional looking charts for business and scientific presentations. Features 25 Chart types, overlays, Superscripts/Subscripts, CricketGraph file import and more. Use the Data Notebook to import spreadsheet data and DeltaGraph will create the chart you want. Then import EPS or PICT files or use DeltaGraph's extensive drawing tools for embellishment. (business) \$97.



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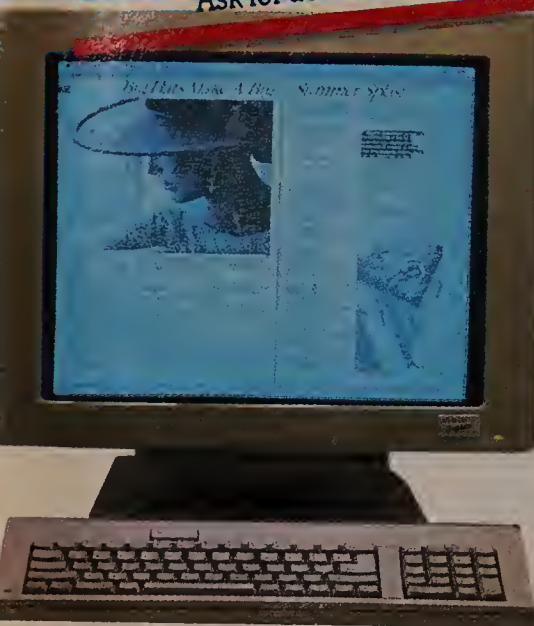
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BlackJack or CrapsMaster .....	ea 27.
BlackJack Strategy Tester .....	65.
CasinoMaster (5 pack) .....	49.
CasinoMaster Deluxe Mac II version ..	55.
<b>MicroLeague Sports</b>	
MicroLeague Baseball II .....	38.
<b>Softstream</b>	
22nd St. Whist Tutor or MacRummy ..	32.
<b>Spectrum Holobyte</b>	
Tetris .....	22.
Welltris .....	19.
<b>The Software Toolworks</b>	
ChessMaster or Life & Death .....	ea 32.
Cribbage & Gin King .....	39.
The Hunt for Red October .....	20.
<b>Three Sixty</b>	
Sands of Fire .....	32.
<b>Toyogo's Nemesis</b>	
Go Master .....	49.
Joseki Genius .....	30.
Tactical Wizard .....	37.
Deluxe .....	99.
<b>Visionary Software</b>	
Synchronicity .....	39.
<b>XOR</b>	
Lunar Rescue or MacGolf 2.0 .....	34.
MacGolf Classic .....	52.
Road Racer .....	39.
NFL Challenge .....	55.
TaskMaker .....	29.

## FONTS

<b>Adobe (Full line available)</b>	
Adobe Type Manager 2.0 .....	55.
Adobe Type Reunion .....	39.
Plus Pack .....	109.
TypeAlign .....	59.
Type Set 1 or Type Set 2 .....	ea. 58.



### MegaScreen Rival (MegaGraphics)

MegaScreen Rival — Macworld Magazine's "First Choice" in black-and-white big screens. Combined with our excellent price, we rate this WYSIWYG two-page system your BEST BUY. 1024 x 826 resolution; flicker-free 75 Hz refresh. Interface cards and cables included. Compatible with Mac Plus, Mac SE, Mac SE/30, and all Mac II models. See line listing for additional MegaScreen systems. (hardware) **\$1,275.**

### Altsys

Fontastic Plus 2.02 .....	51.
Fontographer 3.05 .....	249.
Metamorphosis .....	149.
The Art Importer 2.0 .....	89.
<b>Dubl-Click</b>	
Menu Fonts 3.0 .....	28.
<b>Letraset</b>	
LetraStudio .....	275.
LetraFonts (various) .....	ea. 69.

### WIZ (CalComp)

Everything else is just a mouse! It's a full featured mouse system, compatible with all mouse driven packages. Not only do you have mouse features, but the ability to draw and trace with accuracy, because WIZ has 1000 dpi, absolute positioning and comes with a cross hair pointer on the WIZ mouse. Define macros, minimize wrist movement with adjustable pad scaling. Optional software templates for over 19 software packages, lets you by-pass pull-down menus, making command selection a one click process. Requires Mac II/SE. 5 year MFG. warranty. (input/output) **WIZ tablet \$159, Optional templates \$33 each. Optional 2 button pen \$57.**



### Tactic Software

ArtFonts .....	55.
----------------	-----

## GRAPHICS & DESIGN

### 3G Graphics

Graphics & Symbols 1 .....	50.
Business 1 or Accents & Brdrs 1 ..	ea.65.

### Adobe

Illustrator 3.0 .....	357.
Photoshop .....	499.
Smart Art I, II, III, or IV .....	ea. 84.
Streamline .....	225.

### Aldus

Freehand 2.0 .....	329.
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### Aperture Technology

Aperture Visual Information Mgr. ....	729.
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### Bright Star Technology

HyperAnimator 1.5.1 .....	98.
interFACE .....	249.

### Broderbund

TypeStyler .....	119.
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### Clarix

MacDraw II .....	289.
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### MacPaint 2.0

.....	93.
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### Deneba

Canvas 2.1 .....	189.
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### Ultra Paint

.....	125.
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### SuperLaserSpool 2.02 (SuperMac)

Now spools to HP DeskWriter printer. One of the best selling print spoolers for the Mac is here! You get your Mac back seconds after sending a document to the printer. Prints in the background. Handles large and complex graphics, spreadsheet or database documents. Special desk accessory allows you to see and manipulate the print queue; delete documents, re-order documents to other printers. Also works with all Apple printers and postscript devices using the Apple printer drivers. (utilities) **\$87.**

### Digital Vision

Computer Eyes B&W .....	199.
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Computer Eyes Pro Color .....	349.
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### Dream Maker

Cliptures, Business Images .....	69.
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MacGallery .....	27.
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### Electronic Arts

Studio/1 .....	96.
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Studio/8 .....	295.
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Studio/32 .....	Call.
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### Farallon

MediaTracks .....	189.
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### Innovative Data Design

Dreams .....	319.
--------------	------

### Letraset

Shapes .....	Call.
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### MacroMind

MacroMind Director .....	439.
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### Metro ImageBase (Full Line Available)

Art Deco or ReportMaker .....	ea. 85.
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Newsletter Maker or Business .....	ea. 85.
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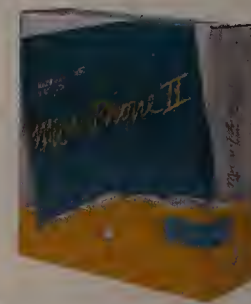
### Mac286 v3.0/Co-Processor

Free Nubus slots while running MS-DOS applications from your Mac II. The Mac286 card slips into a single Nubus slot and provides up to 4MB of RAM to run MS-DOS software in a separate window. Provides IBM AT productivity, compatibility with MultiFinder and true multitasking. (drives/boards) **\$1079.**



### Bulk Mailer 3.25

The ideal mail list management system. Contains duplication capabilities and search codes. Can utilize all fonts and styles, mail merge, envelope printing, plus much more. Works great with Canadian postal codes and other international mailing requirements. (business) **\$75.**



### MicroPhone II 3.0

MicroPhone II scripting language makes using electronic mail services an automatic operation. Other types of file transfers are equally effortless. MicroPhone II 3.0 now supports the hot new ZMODEM, transfer protocol (in addition to XMODEM, YMODEM, KERMIT, and MacTerminal 1.1) and can operate modems at any speed from 50 to 57,600 baud. (communications) **\$215.**

### Micro Frontier

Enhance .....	235.
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### Multi Ad Services

Multi-Ad Creator .....	865.
------------------------	------

### ThunderScan Plus ThunderWorks (Thunderware)

Turn your ImageWriter into a gray scale scanner. Import images into desktop publishing, painting, drawing or OCR programs. Scans in 64 gray levels, edits grays, and comes with 13 special effect filters. **\$199.**

### Lightning Scan 400 with ThunderWorks

Most powerful hand-held scanner for the Mac. Scans flat surfaces instantly. Includes ThunderWorks image editing software for full-page scanning and DA for scanning in any program. Saves in 37 gray levels. Includes SnapGuide and RAM buffer. (input/output) **\$385.**





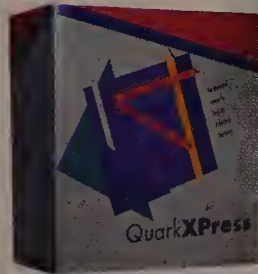
## METAMORPHOSIS

### Metamorphosis (Altsys)

Metamorphosis converts PostScript fonts into a variety of formats, now including Type 1 (ATM-compatible). Edit, modify, or regenerate your PostScript fonts. Manipulate type outlines in Aldus Free-Hand or Adobe Illustrator to create special font effects.

Metamorphosis converts your Type 3 fonts into Type 1 format for more accurate viewing in screen when using Adobe type Manager and more precise printing on any PostScript printer. **\$149.**

**The Art Importer**  
**Sold!** When it comes to collecting imported art, serious Mac users give their high bid to The Art Importer. Use the Art Importer to create high resolution PostScript fonts from Mac artwork. The fonts are compatible with most Mac applications. (fonts) **\$89.**



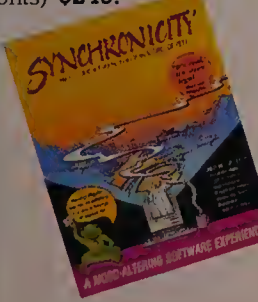
### Quark XPress 3.0

New measurement and page palettes provide interactive on-screen access. A library stores frequently used items, and a pasteboard provides a work area next to each page. Rotate text and graphics in 0.001 degree increments up to 360 degrees. (desktop publishing) **\$519.**



### Fontographer 3.1

Reads and writes Type 1 PostScript fonts! Create & edit downloadable PostScript fonts containing standard alphanumeric and foreign characters, pictograms, icons, and logos. The auto-trace function to saves time when working with scanned characters and images. (fonts) **\$249.**

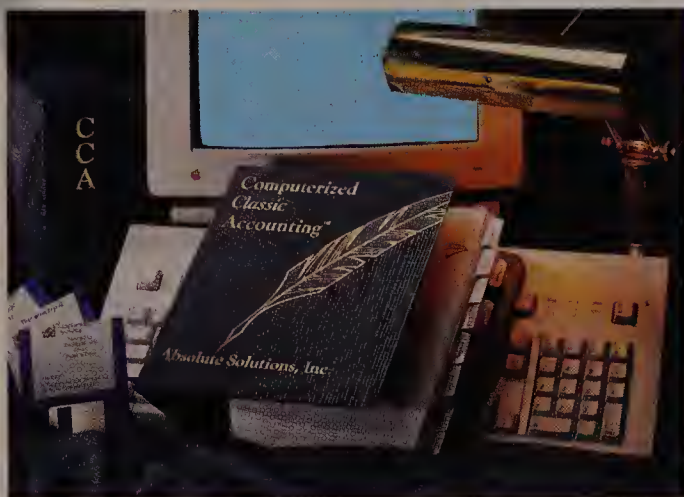


### Synchronicity

This Mac realization of the ancient Chinese book of changes (I Ching) provides needed moments of serenity on busy days. Animation and sound effects send users into peaceful moods while requesting key words to reference several thoughtful passages. (education) **\$39.**

### Computerized Classic Accounting (Absolute Solutions)

Mimicking the paper journals and ledgers that bookkeepers and accountants are accustomed to, Computerized Classic Accounting provides a remarkable level of accounting, record keeping and analysis, in a simple, flexible product that can be easily customized. CCA is the only true, fully integrated spreadsheet accounting product. CCA was nominated



by Macuser for an Eddy and has earned a 4-1/2 mouse rating. (accounting) **\$225.**

### Paracomp

DrawTools ..... 64.  
Swivel 3D 1.1 ..... 295.

### Silicon Beach

Digital Darkroom ..... 248.  
Super 3D 2.0 ..... 315.  
SuperPaint 2.0 ..... 125.

### SoftStream

Relational Objex ..... 150.

### Somak

LaserArt CD-ROM #1 or #2 ..... ea. 59.  
Sharpen Up ..... 59.

### Strata

StrataVISION 3d ..... 375.

### Strategic Mapping, Inc. (Select Micro)

Map Maker 4.5 ..... 295.

### Studiosonics

Colorset 1.5 ..... 229.

### SuperMac

PixelPaint 2.0 ..... 225.  
PixelPaint Professional ..... 389.

### Tactic Software

Art Clips Vol. 1 or Vol. 2 ..... Call.

### T/Maker

Click Art Business Images ..... 32.  
EPS Illustrations ..... 85.  
Business Cartoons ..... 33.

### Zedcor

DeskPaint & DeskDraw ..... 115.

## HARDWARE & PERIPHERALS

### Aapps

DigiVideo ..... 399.  
MicroTV ..... 265.

### General Computing Company

WriteMove Ink Jet Printer ..... 575.

### MegaGraphics

Rival 2001 System for Mac II ..... 1275.  
Rival 3001 System for Mac SE/30 ..... 1275.  
Rival SE System for Mac SE ..... 1275.  
Rival Plus System for Mac Plus ..... 1310.  
19" Color 2008 Hi-Res/Mac II ..... 4460.  
16" Color 2008 Hi-Res/Mac II ..... 3525.  
Grayscale 2008/Mac II ..... 2210.  
Grayscale 3008/Mac SE/30 ..... 2399.

### Microtek

Microtek MSF-300GS Scanner ..... 1589.  
Microtek MSF-300Z Scanner ..... 1998.

### NEC

Intersect CDR-35 ..... 419.

### Qume

Crystal Print Publisher ..... 2900.

### Seikosha America

Seikosha Printer (dot-matrix) ..... 235.

### Sharp

The Wizard ..... 229.

### ThunderWare

LightningScan 400 ..... 385.  
ThunderScan Plus ..... 199.

## HYPERWARE

### Bantam

Complete HyperCard Handbook ..... 22.

### Beacon Technologies

HyperBible International Version ..... 175.  
HyperBible King James Version ..... 145.



### MacEnvelope 5.0 (SYNEX)

Prints labels or envelopes from your database or word processor address lists.

MacEnvelope's WYSIWYG display, Postal Bar Coding, Desk Accessory and 100 preformatted templates (Avery et al.) makes short work of all your mailing chores.

Stores up to 1600 addresses per file, sorted alphabetically or by ZIP code. **\$57.**

### MacEnvelope Plus 2.0

Maintains up to 100,000 names per file. Provides additional list management features including comments, flags, and multilevel sorts. (business) **\$159.**

### Kraft

ADB Joystick Premium III (SE&II) ..... 49.  
QuickStick ..... 39.  
Trackball ..... 79.

### LYNX

QuadLYNX Trackball ..... 59.

### MicroSpeed

MacTrac ADB ..... NEW 75.

### Micro Touch

The UnMouse ..... 189.

### Mouse Systems

A+ Mouse (SE/II) or (512, Plus) ... ea. 58.

### Practical Solutions

The Cordless Mouse ..... 89.

Mouse Master ..... 57.

### Summagraphics

Bit Pad Plus ..... 319.

## LANGUAGES

### Digitalk, Inc.

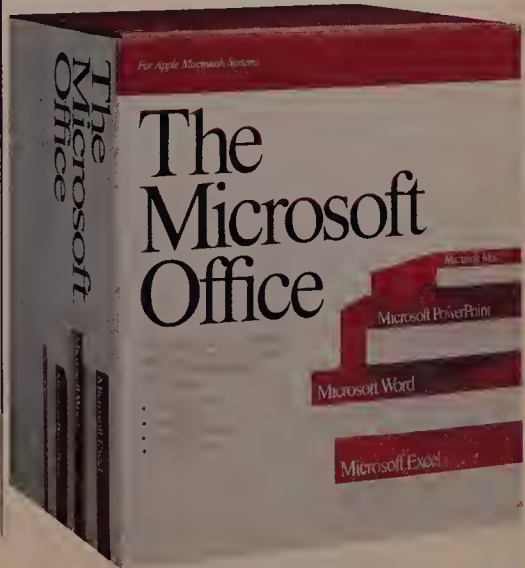
Smalltalk/V MAC ..... 125.

### Microsoft

QuickBasic ..... 64.

### The Microsoft Office (Microsoft)

The Microsoft Office gives you everything you need to increase productivity, word processing (Microsoft Word), spreadsheet (Microsoft Excel), desktop presentations (Microsoft Power Point), and electronic mail (Microsoft Mail) - in one compact package! Each program is a top-selling stand alone product, and when used together, will make your entire office more efficient and productive. (business) **\$525**  
Also available on CD-ROM **\$669.**



### DataDesk International

HyperDialer ..... 39.

### ICOM Simulations

HyperTMON ..... 59.

### MicroMaps

HyperAtlas ..... 59.

### Silicon Beach

SuperCard 1.5 ..... 189.

### Softstream International

HyperHit ..... 125.

### Somak

Script Edit ..... 49.

### Symmetry

HyperDA 1.2 ..... 45.

### TimeWorks

HyperWorks Organizer ..... 57.

## INPUT/OUTPUT

### Calcomp

WIZ Tablet ..... 159.

WIZ Pen ..... 57.

WIZ Templates ..... ea. 33.

### CH Products

Mach IV Plus Mouse/Joystick ..... 49.

Mirage Adaptor ..... 35.

Roller Mouse ADB ..... 75.

### DataDesk Intl.

DataDesk Switchboard ..... 175.

Mac 101 Keyboards ..... 129.

### Forte Communications

Remote Keyboard/Mouse ..... 269.

### Kensington

New Turbo Mouse ..... 109.

### Keytronics

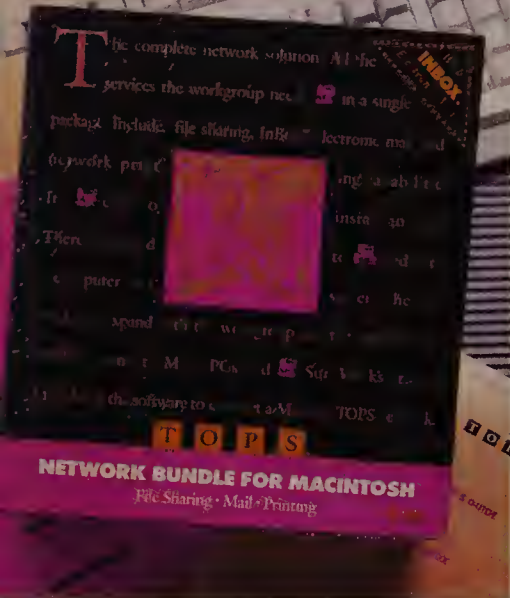
MacPro Keyboard ..... 118.



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**TOPS 3.0 Network Bundle (TOPS)**  
 TOPS 3.0 provides a complete network/E-Mail solution for any combination of Macs, IBM PC's and Sun workstations. With TOPS, every computer is a server and each user decides which files are public or private. TOPS follows AppleTalk File Protocol, so AFP-compatible multi-user applications will run properly. Includes TOPS Spool for background printing on the network, and a 20-user package of InBox 3.0 (networking) MAC **\$187** or DOS **\$165**

**Prometheus**  
 2400 Mini Fax ..... 209.  
 ProModem 2400 SE Int. .... 209.  
 ProModem 2400M ..... 199.  
 ProModem 2400M II ..... 205.  
 Travel Modem ..... 205.  
**Supra**  
 Supra Modem 2400 ..... 129.

## MUSIC AND SOUND

**Altech**  
 MIDI Interface ..... 59.  
**Coda**  
 Finale 2.0 ..... 559.  
 MacDrums ..... 31.  
 Perceive ..... 49.  
**Electronic Arts**  
 Deluxe Music Construction 2.5 ..... 85.



For beginners and experienced modem users. If you need a 2400 baud modem, the SmartOne 2400 Modem provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/originate, 300, 1200 and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes software and cable. (modems) **\$145**

Deluxe Recorder ..... 99.  
**Farallon Computing**  
 MacRecorder (records sound) ..... 159.  
 Screen Recorder ..... 125.  
**Passport Designs**  
 NoteWriter ..... 325.  
 Passport MIDI Interface ..... 89.  
**Primera Software**  
 Different Drummer ..... 59.  
**Repertoire**  
 Music Publisher ..... 359.  
**Resonate**  
 Listen 2.0 ..... 62.  
**Tactic Software**  
 Sound Clips Vol. 1 or 2 ..... ea. 49.

## SECURITY & VIRUS PROTECTION

**ASD Software, Inc.**  
 FileGuard Extended ..... 139.  
 FileGuard Office 5-pack ..... 435.  
 FileGuard Office 10-pack ..... 685.

**KeyPlan (Symmetry)**  
**PLAN WITHOUT PAIN!** Meet the new champion in planning software. Now you can turn fast outlines into successful deadlines. With the speed and ease of use for the light user, power and sophistication for the professional manager (PERT and Gantt charting capabilities) KeyPlan allows you to plan and budget your way to success. From outline to deadline! Creates plans quickly and easily, tests feasibility of ideas, helps implement and track plans, communicates your strategies and plans more effectively. (business) **\$275.**

### AutoSave II (Magic Software)

This very important utility is a CDEV. Just drag it into your system folder, and AutoSave II will issue a periodic Save command to the running application. You can set the interval between saves from one to 99 minutes. AutoSave II keeps your current work safe on disk. (utilities) **\$28.**

### BackMatic

BackMatic automatically backs up your files at a time you specify, including when you shut down your Mac. You can configure it to backup only the files you've changed, or all your most important files. Make backups to floppy disks, hard disks, or file servers. Install this handy INIT in your system folder, and your work will always be safe off disk. (utilities) **\$50.**

### Fifth Generation

Disk Lock ..... 106

### HJC/Microcom

Virex 2.7 ..... 56.

### Kent Marsh

MacSafe II ..... 107.

NightWatch ..... 86.

QuickLock ..... 56.

### Mainstay

AntiToxin ..... 59.

### Symantec Corporation

S. A. M. .... 67.

### SmartOne 2400/1200 Modem

(Best Data Products)



### Lexpertise

MacProof 3.2.1 ..... 115.

### LifeTree

Correct Grammar ..... 49.

### Microlytics

Word Finder 2.0 ..... 34.

### Sensible Software

BookEnds or Sensible Grammar ..... 51.

## STATISTICAL ANALYSIS

### Abacus Concepts

StatView II ..... 279.

StatView SE+Graphics ..... 199.

SuperANOVA ..... 309.

### Wolfram Research

Mathematica (SE) ..... 450.

## UTILITIES

### Abbott Systems

CanOpener 1.1 ..... 64.

### Aladdin Systems Inc.

Programmer's Assistants ..... 75.

Shortcut ..... 46.

StuffIt Deluxe ..... 63.

### ALSoft

DiskExpress II ..... 57.

MultiDisk ..... 49.

Master Juggler ..... 64.

### American Power Conversion

Power Chute ..... 67.

## SPELLING/DICTIONARY THESAURUS CHECKERS

### Deneba Software

BigThesaurus ..... 64.

Spelling Coach Pro 3.1 ..... 125.

### Electronic Arts

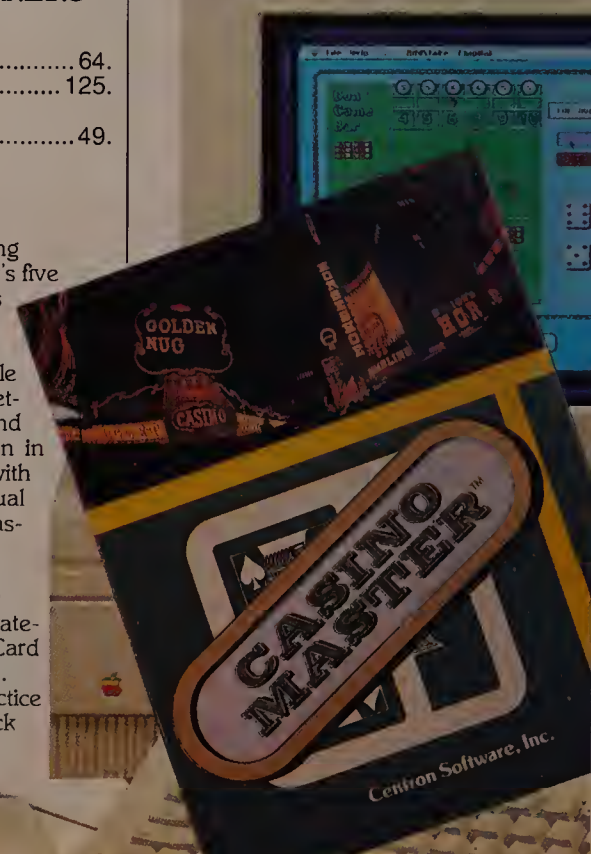
Thunder II ..... 49.

### Casino Master (Centron)

Let it Ride! You can bet on having hours of fun with Casino Master's five exciting casino games. Includes **Blackjack Ace**, **Crapsmaster**, **Roulette Master**, **Pokermaster** and **Baccarat Master**. Exact table simulation, mouse controlled betting, stored win/lose statistics and complete manual. Mac II version in full color! An odds-on favorite with professional gamblers. Individual games **\$27.** / 5 game Casino Master Package **\$49.** / Deluxe Mac II version **\$55.**

### New! Blackjack Strategy Tester

Test your betting and playing strategies over thousands of hands. Card counting, 1-8 decks, 1-7 players. Develop a winning strategy, practice it with Casino Master or Blackjack Ace, then go to the casino with confidence. (entertainment) **\$65.**



### Shana Corporation

Inside Out ..... 369.

### Symantec

THINK'S C 4.0 or Pascal ..... ea. 168.

### Zedcor

ZBasic 5.0 ..... 88.

## MEMORY UPGRADES/ACCELERATORS

### 1 MEG SIMMS

Low Profile, 120ns High Quality Single In-Line Memory Modules for MacPlus, SE, II, IIfx.

2 yr. Warranty. .... Low price **\$79.**

For MacPortable ..... 435.

For IIfx - 80ns ..... 119.

For LaserWriter II NTX - 80ns ..... 119.

### Dove (full line available)

MaraThon 030 Accelerators ..... 449.

MacSnap 2S ..... 199.

MacSnap 4S ..... 399.

MacSnap 8S ..... 799.

MacSnap 524E ..... 185.

MacSnap 524S ..... 239.

MacSnap 548S ..... 499.

## MODEMS/FAX

### Abaton

InterFax 12/48 ..... 265.

InterFax 24/96 ..... 419.

### Best Data Products

SmartOne 2400/1200 ..... 145.

### Dove

DoveFax desktop ..... 279.

DoveFax Networkable desktop ..... 375.

DoveFax Nubus ..... 449.

Networkable Nubus ..... 749.

### Hayes

Smartmodem 2400 ..... 349.

Smartmodem 9600 (V series) ..... 759.

### Power User™

2400 baud modem ..... 99.



# CompuServe

You can now contact MacWAREHOUSE or place orders with us in Electronic Mall on CompuServe. The MacWAREHOUSE GO code is MW. As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.

## UltraScript (QMS)

Unleash the power of your current printer with UltraScript. Now you can have affordable PostScript language printing on virtually any laser, ink jet, or dot matrix printer - even an ImageWriter! Generate scalable, rotatable fonts. Print high quality text and graphics directly from within your applications. Save much more when purchasing additional fonts licensed from the same sources as Adobe. UltraScript for the Macintosh includes 15 typefaces. (utilities) \$115. / UltraScript Plus \$259.



## CE Software

DiskTop 4.0 or QuickKeys 1.2 ..... ea. 64.

## Caere

OmniDraft or OmniSpell ..... ea. 70.

OmniPage ..... 545.

## Central Point Software

Copy II Mac ..... 23.

Mac Tools Deluxe ..... 75.

## Custom Applications

Freedom of Press 2.4 ..... 255.

## Dantz Development

Retrospect ..... 149.

## Dayna Communications

DOS Mounter ..... 55.

## Fifth Generation

FastBack II ..... 106.

PowerStation 2.5 ..... 33.

Suitcase II ..... 43.

## HJC/Microcom

Virex 2.7 ..... 56.

## Peter Norton Utilities

Norton Utilities for the Mac ..... 75.

## QMS

UltraScript ..... 115.

UltraScript Plus ..... 259.

## Software Innovations

HandOff II ..... 50.

## SuperMac

DiskFit 1.5 or SuperSpool 5.0 ..... ea. 58.

Sentinel 2.2 ..... 87.

SuperLaserSpool 2.0 (single user) ..... 87.

Super LaserSpool (5-pack) ..... 289.

## Symantec Corporation

SUM II ..... 99.

## Tactic Software

FontShare 2.0 ..... 149.

Icon-It 2.0 ..... 45.

## SE Radiation Shield (Kensington)

The perfect solution to a glaring problem. This high quality filter reduces the glare reflected from your Macintosh SE screen by 96%, and improves your screen contrast and clarity up to 20 times! Made of optical quality glass with ceramic anti-reflection and scratch-resistant coatings, the Anti-Glare Filter slips right onto the front of your Macintosh for a "light-tight" fit. It even filters out VLF and ELF radiation and dissipates static. And its scratch resistant coating assures years of satisfaction. (accessories) \$54.

## WORD PROCESSORS & OUTLINERS

### Claris

MacWrite II ..... 145.

### Microsoft

Word 4.0 ..... 245.

### Tactic

Clairvoyant ..... 49.

### T/Maker

WriteNow 2.2 ..... 119.

### WordPerfect Corp.

WordPerfect ..... 229.



## ICOM Simulations

On Cue ..... 35.

## Insight Development

MacPrint ..... 95.

## Magic Software

AutoSave II ..... 28.

BackMatic ..... 50.

POWERIcons ..... 39.

## Mainstay

Capture 2.0 ..... 49.

Marco Polo Single ..... 155.

Marco Polo 5-pack ..... 519.

## OLDUVAI

ClipShare ..... 165.

MultiClip 2.0 ..... 69.

## ON Technology

On Location ..... 75.

## FileGuard Extended (ASD Software)

"FileGuard stands out, especially for corporate users." MacUser May, 1990 Issue. Protect your Hard drives and Partitions from unauthorized access (including security bypass with a system diskette), copying, and erasure; Applications and Files/Folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Desktop (including system folder) from alterations by unauthorized users; Keep an eye on System Usage with the system users log which continuously tracks user/group activity. (security) \$139. 5-pack \$435. / 10-pack \$685.

**CONTEST RULES** 1. Entries must be received on or before 8/31/90. 2. Winner selected in random drawing by attorneys for MicroWarehouse Inc. (MWH), whose decisions are final. 3. Concorde trip to London and MacUser UK show subject to availability. MWH reserves the right to substitute wholesale cash value up to \$8000. 4. Winner responsible for taxes. 5. Odds of winning depend on number of entries. 6. MWH will announce the winner on or around 9/30/90. Winner notified by mail. Dates subject to change at the discretion of MWH. If unable to contact winner, an alternate will be selected by random drawing. 7. Contest open to U.S. residents, except where prohibited by law. Employees of MWH and suppliers not eligible. 8. Prize: one round trip ticket to London, including NY-London by Concorde. Hotel accommodation for duration of MacUser UK Show, November 1990. \$500 cash for miscellaneous expenses.

Circle 78 on reader service card

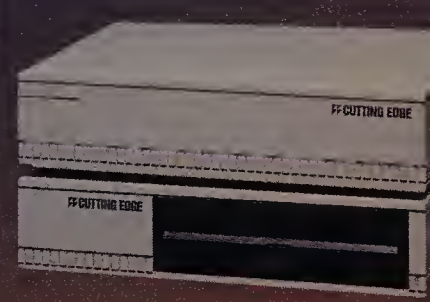
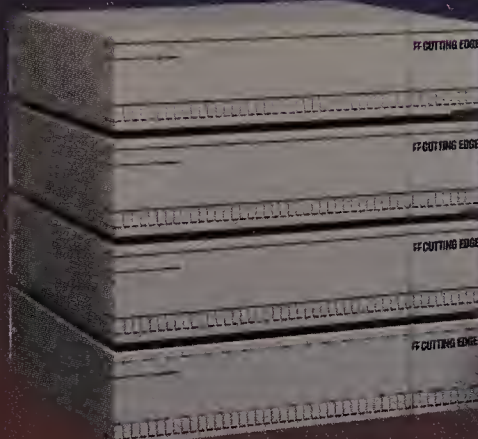
# STOP PRESS

## Cutting Edge Hard Disk Drives (Cutting Edge)

Get an edge on your competition-get a Cutting Edge! Available in 20MB to 80MB sizes, Cutting Edge hard disk drives deliver quiet, reliable memory power with access times as low as

20ns. Its push button external SCSI address switch and removable SCSI terminators allow easy daisy chaining of up to 7 SCSI devices. Need security and portability? The 45MB Removable employs industry standard SyQuest technology and provides unlimited storage through exchangeable cartridges. (see line listings).

(disk drives). **20MB only \$309, 30+MB only \$379, 45+MB only \$435, 60+MB only \$469, 80+MB only \$529. 45MB Removable: \$699.**



## Power User™ 2400 baud Modem

Install a new Power User 2400 baud modem and log-on to CompuServe™ or any of the exciting on-line services! This new full-featured modem comes complete with everything you need to start communicating. It's easy to install and ready to use - all cables and MAC-KNOWLEDGE communication software

are included. Also, all the features you need in a modem, including Auto Answer, Auto Dial, and Advanced Diagnostics for error checking.

**All for \$99!**

We're so sure you'll love the Power User 2400 baud Modem, if for any reason you are dissatisfied, you may return it for a full refund within thirty days of purchase.

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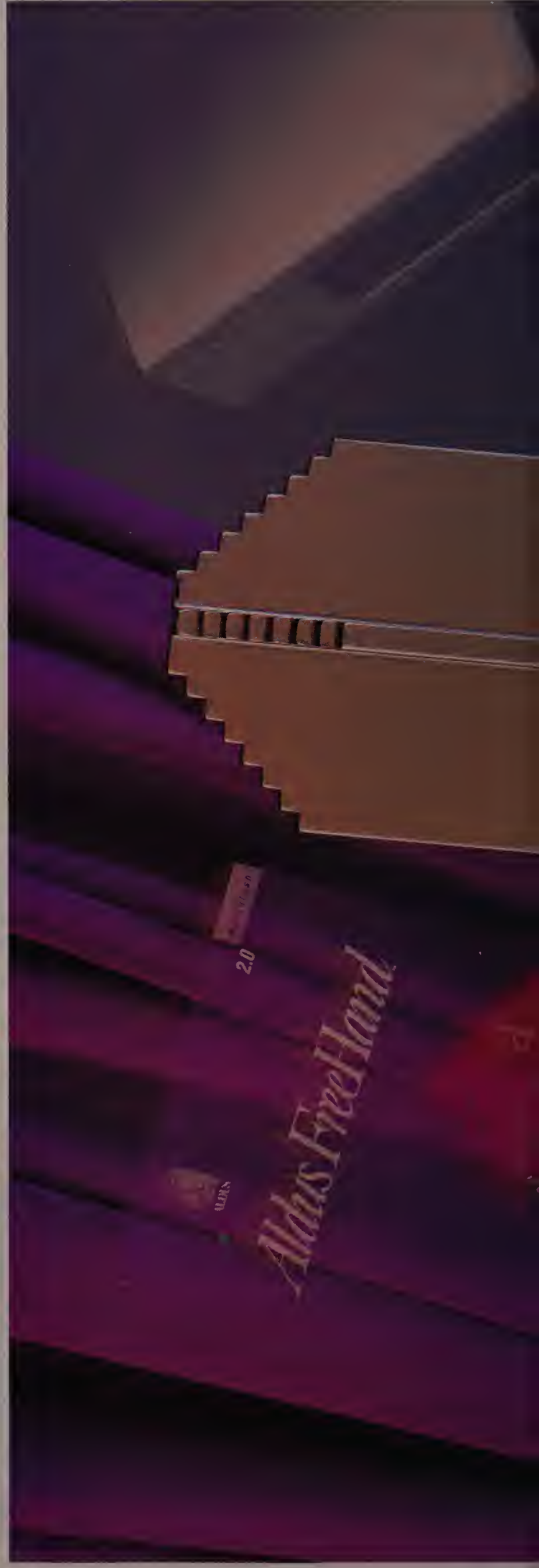


1990

# WORLD-CLASS AWARDS

THE READERS OF MACWORLD MAGAZINE ARE A DISCERNING LOT; WE'VE ALWAYS BELIEVED THAT. AND AFTER LOOKING OVER THE FINAL TALLY FOR THIS YEAR'S WORLD-CLASS AWARDS CONTEST, WE'RE MORE CONVINCED THAN EVER. LISTED ON THE FOLLOWING PAGES ARE THE FORTY-FOUR MACINTOSH PRODUCTS THAT READERS VOTED AS THEIR FAVORITES. CONGRATULATIONS TO EACH OF THE 1990 WORLD-CLASS WINNERS.

BY SUZANNE STEFANAC











*Each year, we solicit reader response by publishing World-Class ballots in our February and March issues. We provide the hardware and software categories, and our readers write in the names of Macintosh products they believe warrant World-Class status. The ballots are then counted by an independent tabulating service, Wilson Associates, and winners are announced at the Macworld Expo in Boston.*

## 1990 HIGHLIGHTS

This is the fourth year that *Macworld* magazine has sponsored the World-Class Awards, and in looking at each year's winners, we find both patterns and surprises. Of our 44 1990 World-Class hardware and software winners, 27 were reader favorites last year as well. Fifteen products deserve special notice because they've been voted World-Class products all four years: the ThunderScan for the digitizer/scanner category; the Radius Full Page Display System for the black-and-white display category; Kensington Microware's Turbo Mouse series for input devices; Hayes's Smartmodem series for modems; Apple's ImageWriter II for dot matrix printers and LaserWriter II series for laser printers; Claris's FileMaker for database management and MacProject for project management; Aldus PageMaker for page layout; Microsoft Word for word processing, Works for integrated package, and Excel for spreadsheets; Symantec's More II for outline processing; FreeSoft's WhiteKnight (formerly Red Ryder) for general communications; and finally, in business accounting, Layco's Insight series won the first three years and the company's atOnce application won this year.

The Most Promising Newcomers for 1990—Hewlett-Packard's DeskWriter printer in the hardware division and Adobe Type Manager (ATM) in software—both provide Macintosh users with reliable, affordable output solutions. The Macintosh IIci and the Macintosh Portable were strong hardware contenders, but ATM swept the software category. It is interesting to note that the spectrum of products voted Most Promising Newcomer was quite wide—72 hardware prod-

ucts each received one vote, as did 95 software products.

In two upsets, Wolfram Research's Mathematica scored higher than Abacus Concepts' StatView, another triple winner. And Aldus FreeHand replaced Adobe Illustrator as the readers' choice in the drawing/illustration/animation category.

## AND THE WINNERS ARE

On the following pages, you will find the list of 1990 World-Class products grouped according to category. The product names in bold are the winners; below each winner we've listed additional products that received a significant number of votes in each category. The percentage associated with *Others* signifies the remaining votes—the higher the number, the greater the number of other contenders in the category. Also, because no reader voted in every category, we've included the percentage of respondents for each category. While the results can't be construed as an endorsement by *Macworld* magazine, they clearly reflect the preferences of our readers.

## 1990'S GRAND-PRIZE WINNERS

The World-Class contest thrives because readers take the time to respond. We are grateful to everyone who submitted a ballot. To thank our readers for participating, we

drew seven ballots at random from among those submitted to the contest and, in cooperation with winning hardware and software companies, these lucky readers will receive selections of this year's World-Class products.

**Michael J. Mandala** is the pastor of Christ the King Catholic Church in San Diego, California. A Mac owner since the first 128Ks in 1984, Father Mandala now uses a Mac SE for his parish work and in his consulting work with inner-city organizations in the San Diego area.

Fourteen-year-old **Jamie Morgan** of Kingwood, Texas, received a Mac Plus from his parents as a reward for getting straight A's in school last year. The Mac helps him keep up with his schoolwork—science is his favorite subject—and he hopes to someday be an astronaut.

Although **Gary R. Presley-Nelson** works in a mainframe environment at Tandem Computers in San Francisco, California, there are enough Macintoshes in his office to warrant the recent installation of AppleTalk. At home, Presley-Nelson has two Mac SEs and his wife, a dentist, has a Mac Plus at her office.

**Amy Schroeter** uses her Mac IIfx with a LaserWriter IINTX and an Apple Scanner to design newsletters, brochures, flyers, and in-house publications for Diesel Specialties in Esterville, Iowa. Her favorite software packages are MacDraw II, PageMaker, PixelPaint Professional, and Microsoft Word.

A resident of New York City, **Bernard Shanfield** is a practitioner of the Hellerwork Method, a type of bodywork pioneered by a student of Ida Rolf. To track his budget and take care of correspondence, Shanfield finds that Microsoft Works with a Mac SE and a LaserWriter IINT meets his needs quite well.

**Ron Smith**, a pediatrician in El Dorado, Arkansas, owns several Macintoshes—a IIfx, a Mac II, two Mac Pluses—and a LaserWriter Plus. Besides designing databases, forms, and a newsletter, Smith finds time to do some programming on the side.

Retired civil engineer **John N. Williams** of Front Royal, Virginia, donated his 128K Mac to his children and now relies on a 2MB Mac II with a GCC Personal LaserPrinter. His consulting firm, Neat Company, specializes in rural area mapping and in setting up emergency 911 databases. "I used to teach Lotus 1-2-3 to evening classes," Williams notes, "until I saw Excel on the Mac. Now I can no longer justify teaching MS-DOS-based spreadsheets when anyone can teach themselves using the Mac."



# HARDWARE

Product, Manufacturer % of votes

## ALTERNATIVE MASS STORAGE



**Data Pak series, Mass Microsystems** 14  
Bernoulli Portable 44, Iomega Corporation 11  
Cirrus removable cartridge drives, La Cie 8  
Ehman 44MB Removable Cartridge, Ehman 8  
REO optical drives, Pinnacle Micro 7  
Others 52  
Total 100

(12% of respondents voted in this category)

## CPU UPGRADE



**Radius Accelerator 25, Radius** 10  
Mac SE/30 Upgrade, Apple Computer 8  
50/030 Accelerator, DayStar Digital 7  
MaraThon 030, Dove Computer 6  
Others 69  
Total 100

(10% of respondents voted in this category)

## DIGITIZER/SCANNER



**HP Scanjet series, Hewlett-Packard** 18  
**ThunderScan, Thunderware** 17  
MSF-300Z, Microtek 15  
Apple Scanner, Apple Computer 14  
Others 36  
Total 100

(22% of respondents voted in this category)

Product, Manufacturer

% of votes

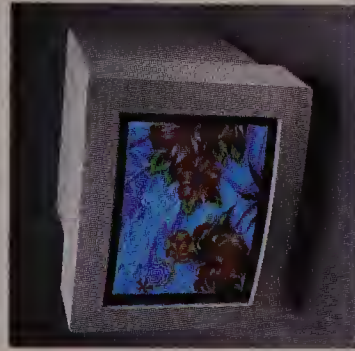
## DISPLAY — BLACK AND WHITE



**Radius Full Page Display System, Radius** 23  
Radius Two Page Display System, Radius 21  
Portrait Display, Apple Computer 13  
ClearVue System, RasterOps 12  
Others 31  
Total 100

(16% of respondents voted in this category)

## DISPLAY — COLOR



**AppleColor High-Resolution RGB Monitor, Apple Computer** 38  
SuperMac 19-inch color monitor, SuperMac Technology 17  
Radius DirectColor Series, Radius 13  
Others 32  
Total 100

(16% of respondents voted in this category)

## GRAPHICS BOARD



**ColorBoard 264, RasterOps** 31  
Spectrum/24, SuperMac Technology 25  
Others 44  
Total 100

(10% of respondents voted in this category)



# HARDWARE

Product, Manufacturer      % of votes



## HARD DISK (80MB OR LESS)

<b>Apple Hard Disk SC series, Apple Computer</b>	<b>9</b>
MacStack series, CMS Enhancements	7
DataFrame XP series, SuperMac Technology	7
Cirrus hard disks, La Cie	6
Others	71
<b>Total</b>	<b>100</b>

(35% of respondents voted in this category)



## HARD DISK (ABOVE 80MB)

<b>Rodime Plus series, Rodime Peripheral Systems</b>	<b>10</b>
Cirrus hard disks, La Cie	8
DataFrame XP series, SuperMac Technology	5
Others	77
<b>Total</b>	<b>100</b>

(12% of respondents voted in this category)



## INPUT DEVICE

<b>Turbo Mouse series, Kensington Microware</b>	<b>41</b>
Apple Mouse, Apple Computer	9
Mac-101 Enhanced Keyboard, DataDesk International	8
Apple Extended Keyboard, Apple Computer	6
Kurta IS/ADB Tablet, Kurta Corporation	5
Others	31
<b>Total</b>	<b>100</b>

(21% of respondents voted in this category)

Product, Manufacturer      % of votes



## PRINTER — COLOR

<b>QMS ColorScript-100 series, QMS</b>	<b>42</b>
HP PaintJet series, Hewlett-Packard	21
ColorQuick Ink-Jet Printer, Tektronix	11
Others	26
<b>Total</b>	<b>100</b>

(12% of respondents voted in this category)



## PRINTER — DOT MATRIX

<b>ImageWriter II, Apple Computer</b>	<b>62</b>
DeskWriter, Hewlett-Packard	8
ImageWriter LQ, Apple Computer	7
WriteImpact Printer, GCC Technologies	7
Others	16
<b>Total</b>	<b>100</b>

(25% of respondents voted in this category)



## PRINTER — LASER

<b>Apple LaserWriter II series, Apple Computer</b>	<b>55</b>
Personal Laser Printer series, GCC Technologies	8
Business Laser Printer series, GCC Technologies	3
HP LaserJet series, Hewlett-Packard	3
Silentwriter, NEC	3
Others	28
<b>Total</b>	<b>100</b>

(37% of respondents voted in this category)





MICRO-TO-MAINFRAME COMMUNICATIONS

MacIrma, Digital Communications Associates

MacMainFrame series, Avatar Corporation

Netway, Tri-Data Systems

Others

Total

(3% of respondents voted in this category)

28  
12  
10  
50  
100



MOST PROMISING NEWCOMER —  
HARDWARE

DeskWriter, Hewlett-Packard

Macintosh Ilci, Apple Computer

Macintosh Portable, Apple Computer

Personal Laser Printer series, GCC Technologies

Others

Total

(22% of respondents voted in this category)

17  
13  
10  
7  
53  
100



MODEM

Smartmodem series, Hayes Microcomputer Products

Practical Modem series, Practical Peripherals

Interfax, Abaton Technology

NetModem series, Shiva Corporation

SupraModem Series, Supra Corporation

Others

Total

(21% of respondents voted in this category)

28  
18  
8  
7  
5  
34  
100



NETWORK

PhoneNet series, Farallon Computing

TOPS FlashBox, Sun Microsystems/TOPS Division

AppleShare, Apple Computer

Others

Total

(8% of respondents voted in this category)

28  
23  
8  
41  
100



BUSINESS ACCOUNTING

atOnce, Layered

Insight Expert Accounting, Layered

Multiledger, CheckMark Software

Simply Accounting, Computer Associates

Business Sense, Monogram Software

Others

Total

(15% of respondents voted in this category)

13  
8  
7  
6  
6  
60  
100

SOFTWARE

Product, Manufacturer % of votes



# SOFTWARE

Product, Manufacturer % of votes



## EDUCATION/TRAINING

<b>HyperCard, Apple Computer</b>	<b>16</b>
Where in the World Is Carmen Sandiego?	9
Brøderbund Software	
Reader Rabbit, The Learning Company	8
Voyager, Carina Software	6
Typing Tutor, Simon & Schuster Computer Software	4
Others	57
Total	100
(13% of respondents voted in this category)	



## GAME

<b>SimCity, Maxis Software</b>	<b>13</b>
Tetris, Spectrum HoloByte	10
Crystal Quest, Casady & Greene	9
Beyond Dark Castle, Silicon Beach Software	7
Falcon, Spectrum HoloByte	6
Others	55
Total	100
(13% of respondents voted in this category)	



## INTEGRATED PACKAGE

<b>Microsoft Works, Microsoft Corporation</b>	<b>87</b>
Microsoft Office, Microsoft Corporation	4
HyperCard, Apple Computer	3
Microsoft Excel, Microsoft Corporation	2
Others	4
Total	100
(20% of respondents voted in this category)	

Product, Manufacturer % of votes



## BUSINESS PRESENTATION GRAPHICS

<b>Aldus Persuasion, Aldus Corporation</b>	<b>42</b>
PowerPoint, Microsoft Corporation	22
CA-Cricket Graph, Computer Associates	4
CA-Cricket Presents, Computer Associates	4
Others	28
Total	100
(24% of respondents voted in this category)	



## COMMUNICATIONS — GENERAL

<b>MicroPhone, Software Ventures*</b>	<b>27</b>
<b>WhiteKnight, The FreeSoft Company*</b>	<b>20</b>
Red Ryder, The FreeSoft Company	13
Smartcom, Hayes Microcomputer Products	9
Others	31
Total	100
(23% of respondents voted in this category)	

\*MicroPhone received the greatest percentage of the vote (27%), but we declared a tie because there is an upgrade policy between WhiteKnight and Red Ryder (with a combined tally of 33%).



## COMPUTER-AIDED DESIGN (CAD)

<b>Claris CAD, Claris Corporation</b>	<b>28</b>
MiniCad+, Diehl Graphsoft	13
Dreams, Innovative Data Design	8
Vellum, Ashlar	8
VersaCAD/Macintosh Edition, VersaCAD Corporation	6
Others	37
Total	100
(13% of respondents voted in this category)	





## DATABASE MANAGEMENT

**FileMaker, Claris Corporation**  
 4th Dimension, ACIUS  
 FoxBase + /Mac, Fox Software  
 Double Helix, Odesta Corporation  
 Others  
 Total

33  
 22  
 10  
 8  
 27  
 100

(33% of respondents voted in this category)



## MICRO-TO-MAINFRAME COMMUNICATIONS

**VersaTerm-Pro, Synergy Software**  
 WhiteKnight, The FreeSoft Company  
 MicroPhone, Software Ventures  
 MacIrma, Digital Communications Associates  
 Others  
 Total

30  
 16  
 7  
 6  
 41  
 100

(6% of respondents voted in this category)



## DESK ACCESSORY

**Suitcase, Fifth Generation Systems**  
 DiskTop, CE Software  
 QuickDex, Casady & Greene  
 Font/DA Juggler Plus, AISoft  
 SmartScrap & The Clipper, Solutions International  
 TypeAlign, Emerald City Software  
 Others  
 Total

21  
 18  
 4  
 3  
 3  
 3  
 48  
 100

(40% of respondents voted in this category)



## MULTIMEDIA

**Director, MacroMind**  
 HyperCard, Apple Computer  
 SuperCard, Silicon Beach Software  
 Others  
 Total

56  
 18  
 8  
 18  
 100

(11% of respondents voted in this category)



## DRAWING/ILLUSTRATION/ANIMATION

**Aldus FreeHand, Aldus Corporation**  
 Adobe Illustrator, Adobe Systems  
 MacDraw, Claris Corporation  
 Canvas, Deneba Software  
 Others  
 Total

28  
 24  
 17  
 12  
 19  
 100

(47% of respondents voted in this category)



## MUSIC

**Finale, Coda Music Software**  
 Studio Session, Bogas Productions  
 Performer, Mark of the Unicorn  
 Vision, Opcode Systems  
 MacRecorder, Farallon Computing  
 Others  
 Total

23  
 10  
 10  
 9  
 8  
 40  
 100

(11% of respondents voted in this category)



# SOFTWARE

Product, Manufacturer	% of votes
PROJECT MANAGEMENT	
MacProject II, Claris Corporation	69
KeyPlan, Symmetry	8
AEC Information Manager, AEC Management Systems	4
Focal Point, TenPoint0 (Activision)	3
Micro Planner Plus, Micro Planning International	3
Others	13
Total	100
(9% of respondents voted in this category)	
SPREADSHEET	
Microsoft Excel, Microsoft Corporation	74
Wingz, Informix Software	21
Microsoft Works, Microsoft Corporation	2
Full Impact, Ashton-Tate	2
Others	1
Total	100
(50% of respondents voted in this category)	
STATISTICS/MATH	
Mathematica, Wolfram Research	31
StatView II/StatView SE + Graphics, Abacus Concepts	18
Data Desk Professional, Odesta Corporation	11
Theorist, Allan Bonadio Associates	6
Others	34
Total	100
(11% of respondents voted in this category)	

Product, Manufacturer	% of votes
OUTLINE PROCESSING	
More II, Symantec Corporation	51
Acta, Symmetry Corporation	24
MindWrite, Access Technology	8
Microsoft Word, Microsoft Corporation	6
Others	11
Total	100
(12% of respondents voted in this category)	
PAGE LAYOUT	
Aldus PageMaker, Aldus Corporation	70
QuarkXPress, Quark	14
ReadySetGo, Letraset USA	9
Others	7
Total	100
(49% of respondents voted in this category)	
PAINT — BLACK AND WHITE	
SuperPaint, Silicon Beach Software	62
MacPaint, Claris Corporation	11
Studio/8, Electronic Arts	8
Canvas, Deneba Software	5
DeskPaint, Zedcor	3
Others	11
Total	100
(32% of respondents voted in this category)	





## PAINT — COLOR

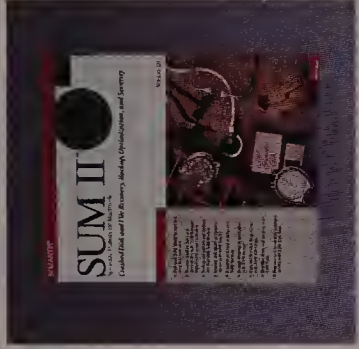
### PixelPaint, SuperMac Technology

Studio/8, Electronic Arts  
SuperPaint, Silicon Beach Software  
Canvas, Deneba Software  
UltraPaint, Deneba Software  
Others

44  
19  
15  
10  
5  
7  
100

Total

(19% of respondents voted in this category)



## UTILITIES — DISK AND FILE

### Symantec Utilities for Macintosh (SUM),

#### Symantec Corporation

DiskTop, CE Software  
PC Tools Deluxe/MacTools, Central Point Software  
DiskExpress, AIsoft  
Others

34  
13  
5  
5  
43  
100

Total

(39% of respondents voted in this category)



## PERSONAL FINANCE/TAXES

### MacInTax, SoftView

#### Quicken, Intuit

MacMoney, Survivor Software  
Managing Your Money, Meca Ventures  
Dollars & Sense, Monogram Software  
Others

36  
36  
11  
9  
4  
4  
100

Total

(32% of respondents voted in this category)



## WORD PROCESSOR

### Microsoft Word, Microsoft Corporation

WriteNow for Macintosh, T/Maker  
MacWrite, Claris Corporation  
WordPerfect for the Mac, WordPerfect Corporation  
FullWrite Professional, Ashton-Tate  
Others

66  
12  
12  
3  
2  
5  
100

Total

(74% of respondents voted in this category)



## PROGRAMMING LANGUAGE

### Think's Lightspeed C, Symantec Corporation

Think's Lightspeed Pascal, Symantec Corporation  
HyperTalk, Apple Computer  
Others

42  
9  
6  
43  
100

Total

(23% of respondents voted in this category)



## MOST PROMISING NEWCOMER — SOFTWARE

### Adobe Type Manager, Adobe Systems

UltraPaint, Deneba Software  
Wingz, Informix Software  
Type Align, Emerald City Software  
TypeStyler, Brøderbund Software  
Other

27  
4  
4  
3  
3  
59  
100

Total

(33% of respondents voted in this category)



Which word  
processor takes the  
laurels when it  
comes to advanced  
document events like  
footnotes, merge,  
indexes, or styles? Six top  
packages compete  
in a septathlon that tests  
the limits of their  
programming prowess.

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# WORD PROCESSOR OLYMPICS

This isn't an Olympic year for sports fans, but for those who use a Macintosh word processor, every year looks like an Olympic year. Annually, like earnest trainers, word processor designers send forth the fruits of months of hard labor. Out in the marketplace, the programs compete in a variety of events, and the one with the best overall score takes home the gold. And every year, even before the medals are handed out, the trainers go back into a huddle and start redesigning new, even more powerful, competitors.

This year's 1990 Word Processor Olympics eschews minor-league contests like multiple columns, headers and footers, page numbers, finding and changing. No, sir. We're talking tough, world-class competition here: footnotes, tables

of contents, glossaries, indexes, cross-references, mail merge, and style sheets. While you may not choose a word processor solely on the strength of its advanced features, if one or more of these special skills are essential to your work, a program's standing in the advanced competition is at least as important as its overall score.

This year's contestants range from heavyweights Microsoft Word 4, WordPerfect 1.0.3, Full Write Professional 1.1, and newcomer Nisus 2.03 to bantamweights WriteNow 2.2 and MacWrite II. (WordPerfect 2.0, scheduled to ship this fall, and Nisus 3.0, which may be available by the time you read this, were not available for review.) Here's my report on this year's winners and losers from *Macworld*'s seat in the press box.

BY ROBERT C. ECKHARDT







### Footnotes and Endnotes

Footnotes and endnotes are to writers what compulsory figures are to figure skaters: an art, a science, a pain in the ankle. But while skaters perform compulsory figures pretty much the same way they always have, writers are now aided by footnote and endnote automation.

Footnote automation is the only Olympic-level function found in all major Macintosh word processors. At its most basic, footnote automation (and to a lesser degree, endnote automation) operates the same way in all programs. You place the insertion point in the main text, select a command, and then enter the text of the footnote. The word processor does everything else: it enters the footnote reference in the main text and at the beginning of the footnote; it numbers the footnote according to the current sequence; it places the footnote at the bottom of the page, and continues it to the next page if necessary; and it readjusts the main text to accommodate the note. Compared to doing footnotes the old-fashioned way, even this basic level of automation is little short of a miracle.

For a perfect 10, however, the judges require more than just a miracle. They give points for the following: user-definable symbols (such as an asterisk) as well as autosequenced numbers for references; the ability to set a document's starting footnote

number and/or reset footnote numbers back to 1 at each new page or document division (such as a new chapter); a choice of reference number configurations (such as <sup>8</sup> or <sup>(8)</sup>); the ability to adjust the space between the



main text and footnotes; control over when and how footnotes are continued (set the minimum number of footnote lines that must remain on a page when the note breaks, for example). Top-class contenders must juggle these and other options and make it look easy (see "The Footnote Finals").

The performances of WriteNow and MacWrite in this event are clearly not top-class. WriteNow doesn't support endnotes at all, for example. Nor does it offer footnote styles or symbol references or allow you to reset footnote numbers within a document.

MacWrite II is one of the few programs in which you see, enter, and edit footnotes and endnotes in the main document window. Otherwise, its footnote and endnote function is not much more sophisticated than WriteNow's.

Like MacWrite, Nisus supports either footnotes or endnotes, but not both in one document. But Nisus surges ahead of both WriteNow and MacWrite by allowing you to: reset footnote numbering at each new page or anywhere within a document; adjust the space between footnotes and the main text; change the appearance of the separator; select from several different reference number configurations; and control footnote continuation. Nisus stumbles, however, in its lack of editable footnote styles, thus forcing you to format reference numbers and notes one by one.

Although each falls short of perfection, Word, WordPerfect, and FullWrite Professional amass the most points in this event. All three programs insert numbers in sequence when you ask for a footnote, but WordPerfect can also insert letters, or symbols if you've defined a sequence for them. The program also offers the widest choice of reference-number configurations, and offers useful controls for the appearance of the separator, the distance between footnotes and text, and footnote continuation. This promising start is marred, however, by WordPerfect's inability to display foot-

## THE FOOTNOTE FINALS

	FullWrite	MacWrite II	Nisus	Word	WordPerfect	WriteNow
Supports endnotes	●	●	●	●	●	○
Place endnotes at document divisions	●	○	○	●	○	○
End- and footnotes in same document	●	○	○	○	●	○
Allows reference symbols	●	●	●	●	●	○
Set starting reference number	●	●	●	●	●	●
Restart numbering each page	○	○	●	●	●	○
Restart elsewhere within document	●	○	●	●	●	○
Displays footnotes in main window	●	●	●	●	○	●
Enter and edit in main window	○	●	○	●	○	○
Offers choice of reference-number configuration	●	○	●	○	●	○
Editable style for all references	○	○	○	●	●	○
Editable style for all foot- and endnote text	●	○	○	●	○	○
Adjust space between notes and text	○	○	●	○	●	○
Editable footnote separator	○	○	●	●	●	○
Controls for footnote continuation	○	○	●	○	●	○

● = yes    ○ = no    ◐ = partially implemented



notes in the main document window and to list endnotes at the end of a document division. The program also lacks editable footnote styles (a problem WordPerfect 2 is supposed to fix).

One reason Word's footnote function is a leader is that the program provides built-in styles, which make footnote and reference formatting easier than in any other program. In addition, Word is the only program that places an editable continuation notice at the split in a continued footnote. Word disappoints, however, because footnotes and endnotes are mutually exclusive within a document, and Word lacks reference number-configuration options, controls over spacing between footnotes and main text, and footnote continuation controls. FullWrite Professional stands up well against Word and WordPerfect, and it alone can refer to a single footnote or endnote in two or more places. But FullWrite falls short as well; it lacks spacing and continuation controls, an editable separator, and an easy way to reset footnote numbers back to one at each new page.

**The Winners:** Overall, footnote fetishists will find more than enough of what they crave in any of the three medalists. For their combination of useful features, user control, and ease of use, Word and FullWrite tie for the gold. WordPerfect actually offers more options and greater control, but several significant omissions and a relatively high level of difficulty relegate it to the bronze.

## Document Merge

The second most widely contested event in the Word Processor Olympics is mail merge; of the six entrants, only Nisus cannot perform mail merge (Paragon promises that Nisus 3 will remedy this deficiency). Mail merge, of course, is the process by which names, addresses, and other information are copied from a data document and inserted in the indicated locations in multiple copies of a main document. Although the pseudo-personal touch provided by merged documents fools no one these days, they are de rigueur for everything from annual holiday newsletters to fund-raising solicitations.

One of the more difficult aspects

TRACK AND FIELD EVENTS: DOCUMENT MERGE					
	FullWrite	MacWrite II	Word	WordPerfect	WriteNow
Automated code entry	●	●	○	●	○
Conditional (IF, THEN) instructions	○	●	●	○	●
Other special instructions	○	○	●	●	●
Reads files from other programs directly	●	●	●	○	●
Merges subset of records in data document	○	●	●	○	●
Prints merged documents to disk	○	●	●	●	●
Sends merged documents directly to printer	●	●	●	●	●

● = yes ○ = no ● = partially implemented

of mail merge is creating and entering the needed merge codes so the program knows what data to put where in the main document (such as insert a name after the salutation *Dear*). Word and WriteNow use identical merge codes, and in both code entry is largely a manual affair. In this regard, Word and WriteNow are sorely in need of an interface-lift. Code entry in FullWrite and WordPerfect is semi-automatic (you select codes from a dialog box or menu) and thus a little easier; neither could be called easy, however, since careful, manual setup is still required. MacWrite, which automatically creates a list of preformatted codes, is the clear winner in this arena (see "A Field Kit for Mail Mergers").

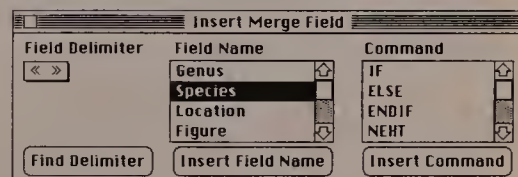
Data codes (names, addresses, phone numbers) are one type of merge code; conditional and special instructions are another. Conditional codes can be difficult to master, but they enable you to do such things as establish conditions under which certain text is or is not printed (for example, you might want to add a request for an especially large contribution if the income figure in a data document is over a certain amount). Special instructions can, for example, cause the program to ask for input during the merge process, or insert the contents of some third document (a contract clause, perhaps) in the merge document.

FullWrite trails badly in this event, since it supports neither conditional nor special instructions (see "Track and Field Events: Document Merge"). MacWrite offers standard conditional instructions only. WordPerfect supports special instructions, but frankly, its merge facility is about as confusing as they get. Ultimately, Word and

WriteNow are way ahead of the others here, since they support a wide and versatile variety of both conditional and special instructions.

All the programs reviewed here can use data exported from spreadsheets or databases. Most read exported tab- or comma-delimited text files directly. FullWrite can read unconverted dBase Mac files as well, while WordPerfect requires that all exported data files be processed by a special conversion utility. Most programs can either send merged documents directly to the printer or "print" them to disk (create a document containing all the merged files). FullWrite alone cannot print to disk, and in WordPerfect, sending the merged documents directly to the printer requires special coding. In both WordPerfect and FullWrite, the merge command always creates a complete set of merged documents; in the other programs, you can merge a subset of the records in the data document if you prefer.

**The Winners:** Document merge in identical-cousins Word and WriteNow is currently unbeaten (but certainly not unbeatable). These two front-runners, which offer a strong



## A Field Kit for Mail Mergers

MacWrite automatically reads a mail merge data document and creates all the corresponding merge codes (left scrolling list). The codes, together with the conditional instructions (right scrolling list), form a merge construction kit that eliminates many common errors that drive mail mergers crazy.



combination of maximum power and only moderate difficulty, would be neck-and-neck but for the fact that Word's table feature can greatly facilitate the creation of a data document. So Word gets the gold and WriteNow the silver. MacWrite's exceptional ease of use but less-powerful functions take the bronze.



### Styles and Style Sheets

Writing without style sheets is like running the marathon with one shoe; it can be done, but why do things the hard way? A style specifies a set of formats ranging from font and font size to paragraph indents and line spacing. A style sheet stores a group of styles and their definitions. With a style, you can apply numerous formats with a single command. Even more important, because styles maintain links to their definitions, when you change a style definition in the style sheet, you simultaneously change the format of all text currently in that style. Simple in concept, styles and style

sheets are undoubtedly the most valuable players in any formatting team.

WriteNow, WordPerfect, and MacWrite are disqualified from this event since none of them support true styles (WordPerfect plans to include them in WordPerfect 2). Nisus offers styles, but they're still in the 98-pound-weakling stage, since they can control character formats, such as font and font size, but not paragraph formats, such as justification or indents (Paragon says this limitation will be lifted with Nisus 3).

Therefore, the only real contest in this event is between FullWrite and Word (see "Style-Sheet Meet and Glossary Games"). FullWrite Professional offers both an array of built-in styles (for document elements such as headers, footnotes, and tables of contents) and user-defined custom styles. In addition to the usual absolute style definitions, such as 14-point Palatino with 18-point leading, you can also create relative style definitions, such as 25 percent greater leading and 3 points larger font size.

While FullWrite's styles are impressive, Word's performance is better in almost all respects. Word's integration of built-in styles and document elements (including outline headings, index levels, and table-of-contents entries) gives it a definite edge. Word's styles are also distinguished by the way in which you can link styles to one another (so you can change the font in all styles, for example, by changing the font in one base style); the fact that you can specify that one style always follow another style (standard

paragraph style follows subhead style, say); and the ease with which you can call up styles from the keyboard, the menu, or the ruler.

**The Winners:** Word's overall approach to style sheets is so thoughtful, well-integrated, and useful that Word easily gets the gold. FullWrite brings home a silver, and Nisus—a very distant third for now—merits a bronze.

### Glossaries

Glossaries are electronic lockers containing often-used graphics or laborious-to-type text. Because they're tagged with, and called up by, simple abbreviations, glossary entries can be inserted in a document quickly and easily. Type "usoc," say, and a glossary can quickly replace it with *United States Olympic Committee*. Ideally, entries useful for different tasks can be stored in different glossary files (one for contracts, for example, and another for horse-race handicapping). You should be able to store glossary files separately from document files and open and close different glossary files as needed.

Neither MacWrite nor WriteNow has glossaries (although 80 bucks will buy you Thunder II, an excellent add-on spelling checker with a built-in glossary function). WordPerfect doesn't support glossaries either, although its macro function lets you create glossary-like macros.

Nisus, FullWrite, and Word have full-fledged glossaries. Nisus and Word glossaries can contain both text and graphic entries, and in both these programs glossary text maintains its style sheet links. In FullWrite, glossaries store only text, and style links to glossary text are severed.

You can open only one glossary at a time in Nisus, but Nisus's glossaries are extremely easy to work with (see "A Gold Medal Glossary"). You can open any number of glossaries in Word, but reviewing and editing entries is no easy task. In FullWrite any number of glossary files can be open at once, and glossary entries can be easily reviewed and edited.

In all three programs, you can have the program immediately flesh out glossary abbreviations as you type. Nisus is unusual in that it can also wait until you finish typing a section of

## STYLE-SHEET MEET AND GLOSSARY GAMES

	FullWrite	Nisus	Word
<b>STYLES AND STYLE SHEETS</b>			
Built-in styles for major document elements	●	○	●
Styles linked to other styles	○	○	●
Styles defined relative to existing formats	●	○	○
Apply styles with menu commands	▶	○	●
<b>GLOSSARIES</b>			
Stores graphics and text	○	●	●
Opens more than one glossary at a time	●	○	●
Replace glossary abbreviations in batches	○	●	○
Editable-glossary entries	●	●	○
Glossary displays entries in full	●	●	○

● = yes   ○ = no   ▶ = partially implemented



text—or the whole document—before replacing all glossary abbreviations with the corresponding full entries.

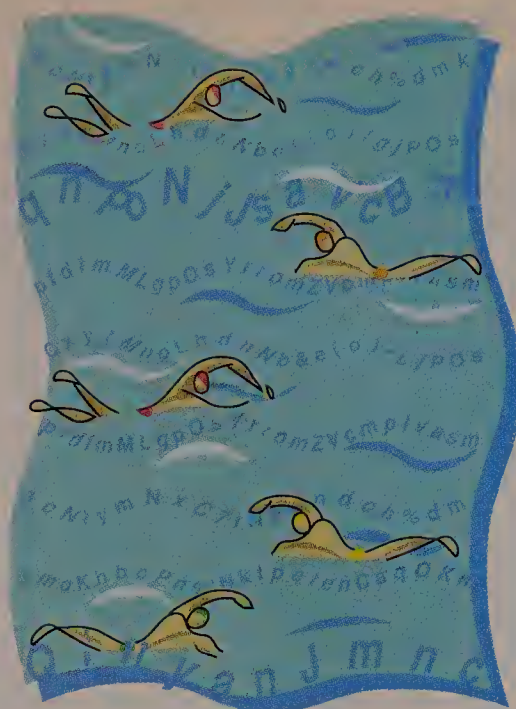
**The Winners:** All three glossary entrants can give weary typing fingers some needed rest. Nisus's excellent glossary function captures the gold, but by only the slimmest of margins, since it loses points for its inability to open more than one glossary at a time and for its awkward interface. Right on Nisus's heels are Word and FullWrite, which share the silver medal.

### Tables of Contents and Other Lists

Extracting a list such as a table of contents or catalog of figures from a completed document is like swimming laps: it's tedious, repetitious work that seems worth the effort only when you can see the results. Neither WriteNow nor MacWrite offers any help with list generation, and thus they drop out of this competition. But FullWrite Professional, Word, Nisus, and WordPerfect are all ready and willing to team up with you for some automatic list production (see "Triathlon: Tables of Contents, Lists, and Indexes").

There are at least as many ways to facilitate the creation of a table of contents as there are programs that do so. Word, for example, provides two ways to create tables of contents that incorporate up to nine organizational levels. One method is based on the program's outline feature. If the document's section heads and subheads are formatted as outline headings, Word can compile a table of contents by making a copy of the embedded outline and adding page numbers.

Alternatively, you can mark text in the document with special codes. Word automates the code-entry process for single-level tables of contents, but for multilevel tables, manual coding is required. Once the text is marked, Word compiles the table of contents by copying the coded text and inserting the appropriate page numbers. Both methods let you hide entries that you want to have appear only in the table of contents and not in the main text. The table is compiled or updated only at your request, and the resulting standard, editable table-of-contents text is placed in a new section (to avoid changing existing page numbers).



Word is the only program that can compile a single table of contents that spans two or more documents. In addition, formatting the table is especially easy and convenient in Word, since the program automatically formats each entry with a built-in table-of-contents style for that level.

FullWrite, too, can extract a multilevel table of contents from an embedded outline; the number of levels is unlimited. Alternatively, the program can compile a table of contents from contents notes—miniature windows anchored to each item you want listed in the table of contents. Text in the contents notes appears only in the table of contents. You indicate levels by manually applying indents.

It's both a blessing and a curse that FullWrite automatically compiles and continually updates the table of contents. The blessing, of course, is that the table of contents instantly reflects every change in the document. The curse is that you can never convert the table of contents to standard, editable text. FullWrite stores the contents table in a separate, largely off-limits, section. You can (usually) add text and apply different formatting to the table of contents, but only with a lot of extra effort—which is just what you're trying to avoid. Moreover, complex or lengthy tables of contents can degrade FullWrite Professional's overall responsiveness.

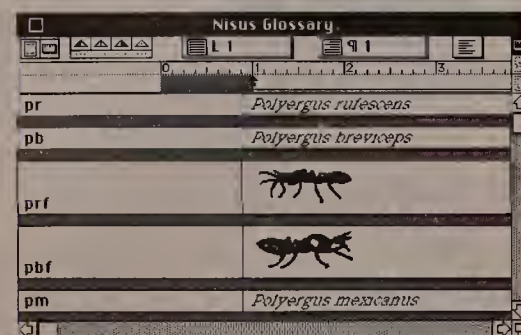
In WordPerfect, you select easy-to-use text formats from a dialog box to mark table-of-contents entries of up to five levels. The program updates or generates the table of contents (along with any other lists and the index) only

when you request it, and WordPerfect can insert the resulting standard, editable text anywhere in the document. These good points are offset by the fact that you must perform all table-of-contents formatting by hand. Worse, there's no way to create entries that appear only in the table of contents and not in the main text.

As in WordPerfect, in Nisus you use a simple text format to mark table-of-contents entries, but the program offers only one level, not five. The program compiles the table only at your request, and the result is standard text. Because Nisus documents cannot be divided into independently paginated sections, the table of contents is placed in a separate document to avoid shifting text and changing page numbers. You must format and indent text (to create different levels) by hand.

With a little imagination, you can use the table-of-contents feature in all four of these programs to create any kind of paginated list (lists of figures, maps, tables, and so on). In FullWrite and Nisus, it's an either/or proposition, since only one list can be generated in a document. FullWrite is unique, however, in that it can automatically number any collection of items, such as all the figures or tables in a document. When you move items from one place to another, FullWrite automatically updates the item numbers. If you combine this powerful numbering function with the table-of-contents facility, the result is quite gratifying.

**The Winners:** The perfect program would display the power of Word (gold), the easy list formats of WordPerfect (silver), and the list-num-



### A Gold Medal Glossary

Although they look a bit cluttered, Nisus glossaries deserve a medal for convenience. The glossary window lets you view graphic entries, edit the contents of text entries (right), and replace entry abbreviations (left).





bering ability of FullWrite Professional (bronze). Even though none score a perfect ten, all three programs put in crowd-pleasing performances.

### Indexes

Before the information age, index creation required a large supply of 3-by-5-inch cards, infinite patience, and strict attention to detail. Patience and attention to detail are still essential, but now built-in indexers in FullWrite Professional, Word, Nisus, and WordPerfect can collect, alphabetize, and paginate entries you have marked in the main text.

Working much as it does with tables of contents, FullWrite extracts text from special miniwindows to create one- or two-level indexes that it compiles and updates automatically.

Again, the index section is off-limits to standard editing and text entry. This, plus the fact that FullWrite automatically applies a single index style to all index entries, serves only to increase the difficulty of making manual improvements to the index. Far more serious problems prevent FullWrite from being a real contender, however. It can approximate but cannot actually duplicate the most common index format, and there is a large but definite upper limit to the number of entries in an index.

In WordPerfect, you can mark document text for use in the index (WordPerfect capitalizes the marked text automatically), or attach a rephrased entry and (if desired) sub-entry. The index generator works similarly to the table-of-contents feature and produces standard text. Inconveniently, you must compile both the index and any tables of contents at the same time. Because you must compile the entire index in one pass, large indexes can cause the compile feature to fail when memory is low.

Although a macro supplied with Nisus can convert a properly constructed, single-level index into a two-level index, the program's index function can create only single-level indexes on its own. You can mark text in the document for use in the index verbatim, or you can attach a rephrased entry to the index marker. You can also specify that individual

entries be in boldface or italics, or that the page number be replaced by a cross-reference. The index is compiled much like a table of contents, producing standard text that must be formatted manually. Unlike any of the other programs, Nisus can insert a comma and a space between each entry and its page number to create a standard index style automatically; all the other programs require that you enter at least the comma by hand.

Word uses special codes to mark index entries of up to seven levels. It automates the code-entry process for single-level indexes, but for multilevel indexes or special types of entries, manual coding is required (see "Tough Guys Do Compile Indexes"). When you request it to, the program compiles an index of standard text. Word automatically formats each index level with a built-in level-specific style so you can easily format the index level-by-level. In addition, Word is the only program that can compile a single index spanning two or more documents, and compile large indexes in small, easier-to-chew segments. It's also the only program that can generate either the standard nested, or the less common run-in, style of index.

**The Winners:** Only two programs are serious about this event. Despite the fact that setup requires a lot of hard work, Word's indexing function leads all the others by at least one lap. For single-level indexes in the standard style, Nisus gets the silver. The other two programs just can't go the distance.

### Cross-References

In traditional publishing, cross-references within a document—especially references to specific pages—are often avoided, since they must be checked and rechecked (and often corrected). In Word, WordPerfect, MacWrite, and WriteNow, cross-references must still be created and checked manually. But in FullWrite Professional and Nisus, many types of cross-references can be monitored and updated automatically.

In Nisus, cross-referencing is a two-step process. First you mark the text to be referenced (a word, a phrase, a figure caption); then you select the cross-reference command, which

## TRIATHLON: TABLES OF CONTENTS, LISTS, AND INDEXES

	FullWrite	Nisus	Word	WordPerfect
<b>TABLES OF CONTENTS AND LISTS</b>				
Maximum number of levels	no limit	1	9	5
Hide marked text	●	●	●	○
Formatting styles for each level	○	○	●	○
Contents table is standard, editable text	○	●	●	●
Maximum number of tables/lists per document	1	1	18	6
Numbers items automatically	●	○	○	○
<b>INDEXES</b>				
Maximum number of levels	2	2 (via macro)	7	2
Hide entries from view	●	●	●	○
Compiles index spanning multiple documents	○	○	●	○
Compiles large indexes in segments	○	○	●	○
Choice of nested or run-in index styles	○	○	●	○
Formatting styles for each index level	○	○	●	○
Index is standard, editable text	○	●	●	●

● = yes    ○ = no



sends the text to a special database. When you reach the point in the document where you want a reference to appear, you go to the reference database and select the previously marked text (such as "Table 5") or its location in the document. To create a phrase like "see Table 5 on page 49," you can select both types of cross-reference. Location cross-references are updated automatically. When changes to text affect cross-references (such as when Table 5 becomes Table 7) you must update the reference with a special command.

Because it's tied in with FullWrite's automatic numbering of classified elements, cross-referencing in FullWrite requires an additional step. First you create a classification category (such as tables, figures, or text), then you classify the item to be cross-referenced. Finally, you enter the cross-reference, which can include the item name and number, or the page number, or both (see "Writing Yourself a Citation"). Classification numbers (such as figure numbers) are displayed and automatically updated in the cross-reference; page numbers are not displayed in the document window, but they are updated when you print.

**The Winners:** The cross-reference functions in either FullWrite Professional or Nisus can be helpful, though a combination of both programs' abilities, plus the ability to reference material in other documents, would be closer to the ideal. Nonetheless, cross-references in FullWrite are part of a larger scheme in which items can be numbered and compiled in a list automatically. As a result, FullWrite's cross-references pack a significant punch, and get the gold. But Nisus manages to score, too, in its ability to cross-reference actual text, such as figure captions or subheads, and earns a silver medal as a result.

### Cue Music, Raise Flags

Just as the Olympics can't include every sport known to humankind, our Word Processor Olympics doesn't cover every aspect of word processing. But in the seven events in this Olympiad, the final tally is clear: Word is first; FullWrite is a distant second; and Nisus takes third (see "Winners' Circle"). Of course, just as the num-

# WINNERS' CIRCLE

Word Processor	Gold	Silver	Bronze
Microsoft Word 4.0	3	2	1
FullWrite Professional 1.1	1	1	1
Nisus 2.03	1	1	1
WordPerfect 1.0.3	0	1	1
WriteNow 2.2	0	1	0
MacWrite II	0	0	1

The seven events in our Olympiad test only a fraction of these word processors' functions. When it comes to the events in question, however, the results are clear: Microsoft Word, WriteNow, and Nisus take the lion's share of the medals and the glory.

*FullWrite*

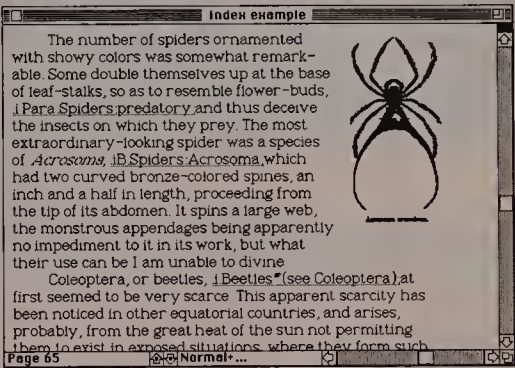
ber of medals on an athlete's chest doesn't always tell you how well he or she functions in the real world, how well a word processor fits your needs is only partly related to the advanced events covered here.

WordPerfect's low score may well reflect the opinion of many Macintosh users, for example, but many people migrating from PC compatibles apparently find the program to be just their cup of tea. In contrast, FullWrite's high medal count doesn't excuse its sluggish performance on Mac Pluses and SEs or the program's insatiable appetite for RAM. And Nisus's good showing doesn't take into account its poorly organized menu structure and hastily slapped-together feel (or its convenient built-in graphics program, for that matter).

But if you regularly use any of the advanced features described here, pick a word processor that has both good basic skills (see "Words, Words, Everywhere" in the September 1989 *Macworld*) and mastery of the finer points. Doing so will put you, too, in the winner's circle.

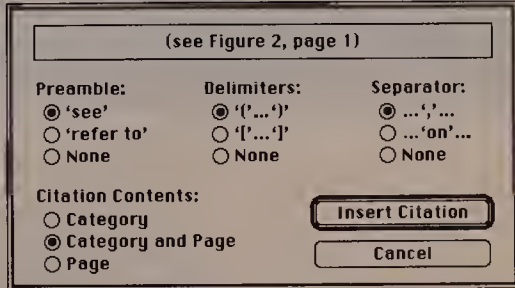
See *Where to Buy* for contact information.

.....  
**Robert C. Eckhardt** is a contributing editor of *Macworld* and *Publish* and the author of *The Fully Powered Mac (Brady)* and other books.



### Tough Guys Do Compile Indexes

Word's manually entered index codes are daunting but powerful. They can be used to create multilevel indexes (like the three-level entry code in line 5), to specify bold or italic page numbers for special-interest entries (line 8), and to enter cross-references (line 15) or page ranges instead of a simple page number. The codes here are underlined, which means they're formatted as hidden text and do not appear when you print the main text.



### Writing Yourself a Citation

In FullWrite, you construct cross-references (citations) by selecting options, building-block-style, in the Citation dialog box. FullWrite displays the citation at the top of the dialog box and, when you press Return, inserts the citation in the text as a single, uneditable object.





TOM WOLFF

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*Liz Vantrease used the Mac to transform an empty stage into a room full of music. One act of her opera, Liz, composed and scored on the Mac, was recently performed at the Virginia Commonwealth University Performance Arts Center.*

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# WITH A LITTLE HELP FROM MY MAC

**For most people, the Mac makes things easier. For people with disabilities, it can make the impossible possible.**

*by Brita Meng*

Liz Vantrease, of Richmond, Virginia, is writing an opera.

In 1985, after 13 years as a newspaper reporter and editor, she followed a lifelong dream to the master's program in music composition at Virginia Commonwealth University. Halfway through, she was diagnosed with amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease.

Knowing Vantrease would eventually lose the strength to handwrite her music, two friends gave her a Mac on an indefinite loan. Using Mark of the Unicorn's Professional Composer to write and print scores, she completed her degree in 1988. Although Vantrease no longer works full-time, she is now a free-lance music critic for the *Richmond News Leader*.

"Without my computer, I'd be in a lonely, silent, boring world. Three scenes of my opera, a suite for piano, and a piece for flutes wouldn't exist—because I wouldn't have been able to write them down. Because ALS impairs my speech, I communicate by typing messages on my computer to friends, family, doctors, and my computer bulletin board pals."

She continues, "My Mac helps me keep up with world news and with trends in music (through a music bulletin board). I get support and helpful advice from folks in the disabilities forum on CompuServe. In short, my computer and modem give me a window to the world into which my feeble legs and arms can no longer carry me."

Vantrease isn't the only person who feels that way about her Mac. Computers now enable disabled people to work without leaving

home, communicate without being able to speak, and read without being able to turn pages or see. For many individuals with disabilities, computers are more than just an easier way to do things. They're a way to achieve independence and maintain self-esteem.

## **Many Needs, Many Solutions**

According to U.S. government estimates, 15 percent of the population is disabled—over 42 million children and adults in this country alone. An additional 750 million disabled people live in other parts of the world. That total is growing by more than a half million people every year. In fact, one family in three is dealing with some form of disability.

Disability can be defined as a lack of fit between a person's goals, his or her capacities, and the resources in the environment. For a wheelchair user, disability is not being confined to a wheelchair, it's being confronted with a flight of stairs. For a child with dysgraphia (a fine-motor problem that affects handwriting), disability is not poor handwriting, it's having a pencil as his or her only available writing tool.

There is a growing sense among people with disabilities, their families, doctors, and therapists that something almost magical can happen when people with disabilities encounter a computer. The problem is how to make that magic work for a particular person (see "Finding Resources"). With the right equipment, computer access can expand an individual's abilities and increase his or her independence at home, at work, and at school.

**"MY COMPUTER  
GIVES ME A  
WINDOW TO THE  
WORLD INTO  
WHICH MY FEEBLE  
LEGS AND ARMS  
CAN NO LONGER  
CARRY ME."**



**MATTHEW, A  
STUDENT WITH  
SEVERE CEREBRAL  
PALSY, IS IN  
A REGULAR FIRST-  
GRADE CLASS  
—THANKS  
TO HYPERCARD.**

along with a puff switch (which users blow into) for making selections.

For keyboard emulation he uses a Swedish product called a Temac, manufactured by RehabCenter AB. The Temac has 100 LEDs, each corresponding to a keyboard key. When Alm wants to type a letter, he highlights a particular LED key, and blows into the HeadMaster puff switch to select that character. "I have used several software keyboard-emulation programs," says Alm, "but those weren't 100 percent compatible with all programs. With the Temac keyboard I can type about 100 keystrokes per minute." With his head mouse and keyboard, special design controls, and a custom HyperCard stack, Alm now uses three Macs to control his home environment, open doors, dial the phone, and operate his stereo, TV, and VCR (see "Enabling Electronics").

Adaptive peripherals are essential access devices for many people with physical challenges such as André Alm. Rapidly emerging as equally critical is the software that comes bundled with all Macs: HyperCard. At the Center for Applied Special Technology (CAST), HyperCard plays a vital role in helping disabled children become more independent. Matthew Huggins is a student with severe cerebral palsy that leaves him unable to control his limbs or talk. Although he cannot use any traditional curricular materials, Matthew is in a regular first-grade class—thanks to HyperCard.

When Matthew turns on his Mac, he sees a customized HyperCard Home Card, where buttons highlight sequentially (a process called scanning) so that he can choose the activity he wants. Although Matthew can't point or use a keyboard, he makes selections by clicking his chin switch, which substitutes for a mouse. From his Home Card, Matthew can choose among a variety of HyperCard stacks developed by CAST. Through these stacks, Matthew and others like him can access an entire first-grade curriculum, as well as play games, type, read sports stories, and control home environmentals (lights, heaters, radios, and so forth). By clicking on an icon, he can go to his library of scanned books and browse pictures or hear stories read aloud. He also writes with a scanning, on-screen word processor.

The liberating effect that the Macintosh can have on the life of a student is mirrored in the business world. Together with his wife, Sarah, David Skinner operates Thrushwood Publishing, a laser desktop publishing service, from their farm outside of Ottawa. "I am 43 and have had ALS for at least 12 years," explains Skinner. "I have not been able to write or type since late in 1982, and I completely lost the ability to speak last year. I am quadriplegic, ventilated

[need assistance to breathe], and dependent on a stomach tube for feeding. I do, however, have near perfect hearing and eyesight."

To communicate, Skinner uses the Communi-Mate by Wells & Ryan of Indian Creek, Illinois. Communi-Mate is a computer based, menu-driven alternate communication and environmental-control system that can be operated with a single switch. It's connected to Skinner's own computer system—Thrushwood uses a Mac for desktop publishing—which consists of a Laser 128EX computer (Apple IIe clone), a Votrex speech synthesizer, a Radio Shack household appliance controller, and a Laser 190A dot matrix printer. Skinner operates the Communi-Mate by using an eyebrow switch to select options when they highlight from available menus: signal, text composition, environmental control, medical options, and basic conversation. "By using it to dictate instructions, I can use the Macintosh with the help of Sarah or one of the nurses in charge of my care six hours a day."

"In addition to the normal, mundane uses one might expect—small talk, calling for help, turning lights on and off—I use my computer for heavy duty writing," Skinner continues. "Besides the large amount of correspondence I deal with, I also produce articles for several newsletters and journals, and have started work on my first book. We scan the Communi-Mate's output into a Mac II for final editing and layout. Dest's Publish Pac OCR software can read the Epson font, often with 100 percent accuracy."

### Sensory Challenges

People with sensory disabilities have a different set of needs than do those with physical disabilities. The possibilities the Mac offers to the blind and visually impaired are dramatic—despite the fact that the Mac's graphical interface is so visually oriented and requires a certain amount of hand-eye coordination.

Marc Sutton, a technical-support person at Berkeley Systems, is blind. He was the prime tester and documentation writer for Berkeley Systems' Outspoken, a screen-reading program that uses Apple's Macintalk to pronounce words. With the numeric keypad as a mouse, users can navigate around the screen as Outspoken announces "window," "icon," and other visual landmarks of the Mac interface in synthesized speech. Because the program can read aloud lines or individual words, users can also use Outspoken to browse and edit text.

According to Sutton, "The Mac is a reading and writing device that lets you keep up with sighted people. It gives access to jobs, information stored in books in libraries, and other electronic formats—online and on CD ROM. For example, you can scan a book with a scan-





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*When the new school year starts, seven-year-old Megan Rasbold-Gabbard will join other first-graders in class at the Butler School in Belmont, Massachusetts. Because she has cerebral palsy, Megan uses the Mac to communicate with her classmates, like Shannon and Jason here.*

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"THINK ABOUT IT,"  
HE TYPED TO ME  
OVER THE NETWORK,  
"WITHOUT TELE-  
COMMUNICATION,  
I COULD NOT SHARE  
THESE THOUGHTS  
WITH YOU."

ner, then convert it to text with optical character recognition (OCR) software, and print it with a braille printer, like TeleSensory Systems' VersaPoint 40. It does a lot for someone's independence."

He continues, "One reason the Mac is good for visually disabled users is because, thanks to Apple, there are developer standards for Mac software. The File menu is always in the same place. The Edit menu is in the same place. And so on. One of the hardest parts of doing Outspoken was the nonstandard dialog setups some software developers use."

Robbie Park, a high-school student who has low-vision and physical disabilities, uses Articulate Systems' Voice Navigator, a speech-recognition system. After training the Voice Navigator to recognize his speech, Robbie can tell the Mac to open a file, to type a word, or to dial a telephone number, simply by saying what he wants out loud.

Because of his visual disability, Robbie needs his text enlarged on the screen through CloseView and his text read aloud with Talking

Keys, a public domain desk accessory that uses Macintosh. Once again, HyperCard plays an important role—Robbie uses stacks developed at CAST to organize his hard drive and do his homework.

Hearing disabilities may be a less formidable obstacle to using a Mac than blindness or visual impairment. But a computer can affect a hearing-impaired user in profound ways. Barry Prowell is a senior programmer analyst for Bull HN Worldwide Information Systems and a Vietnam veteran with a nearly total loss of hearing and the use of only one hand.

"My greatest use comes in the area of telecommunications. My Apple II computer is my telephone. I have enough hearing left that when coupled with my speech-reading abilities, I can converse without too many problems. The problem is, if I can't see who I am talking to, I can't hear. Since conversing online is really reading and typing, we have an excellent environment for the hearing impaired."

Prowell operates the AzApple Special Needs BBS in Phoenix. "If someone wants to reach me and they have a computer, it's just a matter of dropping a mailbox message to me. The same applies to America Online. Think about it," he typed to me over the network, "without telecommunication, I could not share these thoughts with you as quickly or easily."

### Technology for Learning

Like physical and sensory challenges, learning disabilities continue to affect people throughout their lives—not just while they're in school. For example, a child who can't read (decode) words—although bright and interested enough to learn—can't gain access to the ideas in books. Often, a learning disability causes difficulty in expressing thoughts and ideas in writing. Spelling, grammar, and writing organization can all be affected, so that it's not uncommon for a learning disabled (LD) college student who speaks fluently to write at the eighth- or ninth-grade level.

In schools and colleges across the country, students with learning disabilities are using off-the-shelf Mac software to help overcome their difficulties. Outline processors such as Acta Advantage, for example, can provide an easy and flexible way to organize—and reorganize—thoughts for papers. Writing aids like Deneba's Spelling Coach Professional can help students concentrate less on mechanics and more on expression.

Even basic word processors can make writing easier for anyone who has trouble with more conventional techniques. According to Richard Wanderman, a HyperCard developer and founder of the Forman School's Macintosh



PETER JONES

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*Not all disabilities are obvious to the eye.  
Fourteen-year-old James Nellson uses a Mac to overcome his  
difficulties with the mechanics of written  
language: spelling, handwriting, and composition.*

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## FINDING RESOURCES

**M**any disabled people do not know about new technologies that can help them, where to get information about special equipment, or how to pay for it. Information services such as CompuServe, America Online, and GEnie all have dedicated forums or roundtables for discussing disability issues. Many user groups have special-interest groups for users with disabilities. In addition, there are a number of organizations devoted to helping individuals with disabilities gain access to computers.

Founded jointly in 1987 by Apple and the Disabled Children's Computer Group (DCCG) of Berkeley, California, the Alliance for Technology Access (ATA)—formerly called the National Special Education Alliance (NSEA)—is a coalition of independent organizations dedicated to providing disabled individuals access to information and resources on using computers of all types, including Macs.

Each ATA member operates a resource center equipped with a variety

of computers, adaptive devices, and software. There are currently over 40 ATA resource centers around the country.

According to Alan Brightman, manager of Special Education and Rehabilitation at Apple, "Disabled people often have problems with retail establishments. Aside from general access barriers like stairs, there's a high intimidation factor. And of course, typical retailers usually don't carry a wide variety of adaptive devices for people with disabilities to try out."

The goal of ATA centers is not only to help people find an appropriate computer, but also to help individuals adapt that computer to their particular needs. Although each non-profit resource center has its own area of expertise, they share information via AppleLink. That enables a center specializing in the needs of people with visual disabilities, say, to draw on the resources and expertise of another, which may focus on individuals with learning disabilities. See *Where to Buy*

under ATA Centers in the back of this issue for a list of ATA locations and phone numbers.

Another available resource is the Trace Center at the University of Wisconsin Madison, a leading center for development and evaluation of computers and adaptive devices for people with disabilities (608/262-6966). It offers HyperCard-controlled CD ROM and floppy-based versions of Abledata, a database of all adaptive technology products—from wheelchairs to headmice. In addition, the staff that maintains the Abledata database will search their product database for people who call (800/344-5405, voice or TDD).

Closing the Gap publishes a bi-monthly newspaper about computer technology for people with special needs. One issue each year is a resource directory that lists vendors of hardware and software and organizations for disabled computer users. Write to the group at P.O. Box 68, Henderson, MN 56044 (or call them at 612/248-3294)—**B.M.**

writing lab for LD students, "By separating composition from production, the Mac empowers people who otherwise cannot write. As a dyslexic user myself, I can't begin to tell you the difference the Mac has made."

Jay Brill is the president of the National Network of LD Adults. "My dysgraphia—inability to write—prevents me from writing more than a few words at a time legibly. But with the Mac, I am free to write without worrying about my writing, my spelling, or organization. When I'm through, there are no eraser holes worn through the paper, and every letter looks the same."

HyperCard can be as useful for dyslexic students as it is for those with physical or sensory challenges. Digitized speech can be stored in HyperCard stacks through the MacRecorder from Farallon Computing, enabling poor readers to hear selected text read aloud when they are unsure of a word. HyperCard's Find command can help users with organizational difficulties locate related information easily.

### Talking Back

Modern technology has redefined the way people think about disabilities—in fact, in many cases, technology has eliminated the greater

part of the disability itself. But many agree there are still barriers to full independence.

Barry Prowell says, "As for the hardware vendors, I have one question: When are you going to put the damn power switch on the front of the machine? I shouldn't complain, because I can screw in a 3-foot extension to my artificial arm and reach the sucker. And while you're at it, put a master reset button there too."

Steve Magleby adds, "Macs are so much easier for all kinds of disabled people to use. It's unfortunate that Apple has yet to produce the much-rumored low-cost Mac."

Says Liz Vantrease, "A lighter-weight portable Mac would be very helpful. I need to be able to take a computer with voice synthesizer along with me when I go out to see doctors or friends."

David Skinner agrees. "Sarah and I like to travel a lot, and no longer being able to talk adds stress to a task that's not easy at the best of times. Even with a battery pack, the Communi-Mate is not really portable. Right now, if I try to get Sarah's attention in the car, she doesn't know if we took a wrong turn and are headed for Havana or whether I have a sore bum!"



## STATUTES OF LIBERTY

**T**hanks to several federal laws, people with disabilities now have legal rights to challenge discriminatory action and to request services.

**Public Law (PL) 94-142, the Education for all Handicapped Children Act**, requires school districts to provide accessible technological aids to students with disabilities if those aids will enable those students to be competitive with other students. Federal law mandates that a child of elementary- or secondary-school age with an identified disability have an Individual Educational Plan (IEP). If you feel your child could benefit from computer technology, you must ensure that access to technology is written into the IEP. For example, should a student's disability prevent him or her from speaking or writing, an IEP can call for a computer communication aid that produces synthesized speech, enabling a student to communicate with teachers and classmates. Parents have the right to appeal IEP decisions should parents and school disagree on the potential benefit of computer access. All states have Parent Advocacy Pro-

grams to help parents of children with disabilities.

**Section 504 of the Rehabilitation Act of 1973 (PL 99-506)** mandates non-discrimination in postsecondary programs. While Section 504 does not require colleges to provide students with individual computers, it does require nondiscriminatory access to any campus computer that is part of the normal college experience. Students denied nondiscriminatory access to computers on campus should file complaints with their campus Section 504-compliance officer or with the U.S. Office for Civil Rights.

**PL 100-407, the Technology-Related Assistance for Individuals with Disabilities Act**, is designed to help states inform persons with disabilities about the potential impact of technology on their lives, and to provide the mechanisms to put assistive technology into their hands. By May 1990, the U.S. Department of Education had funded 23 states under PL 100-407. For more information, contact state and local government offices about such state programs.

**Section 508 of the 1986 Amendments to the Rehabilitation Act of 1973** addresses technology-access rights of disabled individuals in the federal work force. Section 508 requires that all computers in the federal workplace—either out of the box or via adaptive aids—be accessible to persons with disabilities. Private industry and higher education are increasingly using the specific guidelines of Section 508 to define computer access for persons with disabilities.

In what's being called a landmark civil-rights bill, the **Americans with Disabilities Act (ADA)** will extend the equal-access rights of people with disabilities to the private sector, in addition to the federal work force. Covering substantially more than technology access, ADA mandates nondiscrimination in matters including, but not limited to, employment, education, and transportation. ADA has passed in the Senate and the House of Representatives. As of this writing, the bill is in joint committee awaiting reconciliation of the Senate and House versions.—*Jay Brill*

"THE MAC CAN  
GIVE YOU BACK  
SOME OF THE  
THINGS THAT WERE  
STOLEN FROM  
YOU BY ILLNESS,  
ACCIDENT,  
OR BIRTH DEFECT."

For software developers, André Alm offers some advice. "A disabled person nearly always has problems in physically handling the looking up of information in manuals. I would really like to see them include much more online help in their programs."

Barry Prowell has another comment. "I only have five fingers. I just love those developers who write programs that make you press the Option key, Shift key, and X to do something. Hold the keys down, click the mouse, and drag . . . I only have so many appendages to work with before I get accused of kinky computing."

Richard Wanderman pleads for a better speech-synthesis program than Macintalk, the only software-based speech synthesizer on the Macintosh. Doctors at CAST agree. According to program director Anne Meyer, "An intelligible, inexpensive, text-to-speech system is critical for children with learning and communication disabilities." Digitizing speech with the MacRecorder for playback on the Macintosh—which sounds much more natural than Macintalk—simply takes up too much room on a disk drive.

## Independence in 1990

No matter what type of disability is involved, computers in general, and the Macintosh in particular, are significant tools for enhancing users' independence.

Liz Vantrease says it all when she observes, "The Mac is an empowering device. It can give you back some of the things that were so unfairly stolen from you by illness, accident, or birth defect."

Given the prevalence of physical, sensory, and learning disabilities, the odds are good that you know someone who might benefit from a computer, or that you yourself have a disability that might be well served by one of the Mac's features or products (if so, you may want to contact one of the organizations listed in "Finding Resources"). Greater awareness in the public at large of the computer's capabilities offers the greatest promise of all for fulfilling the potential for independence that can be unlocked by a Mac. **M**

See *Where to Buy* for contact information on products and ATA centers.



# Best Buys in

La Cie's Tsunami, GCC Technologies' UltraDrive, Storage Dimensions' MacinStor, Rodime Systems' Cobra, and EMAC's Metro



PHOTOGRAPHS BY MARK JOHANN

## Low-Capacity DRIVES

BY CHERYL  
ENGLAND  
SPENCER

Believe it or not, some folks don't need a drive larger than 40MB, 50MB, or 60MB. For you non-pack rat types, Macworld Labs reviews 54 low-capacity drives.



**I**t's all Apple's fault. If it would just offer a reasonably priced drive in every capacity for every Mac, then users wouldn't need to wade through spec sheets and price lists to choose a drive. But Apple can't do that—it would have too many options and configurations to deal with for just a peripheral business.

So other companies are flooding in to fill the gaps that Apple has left. And, boy, are those companies creating a torrent. In fact, so many companies have set up shop that you begin to wonder how they can all survive. Well, many won't. Jasmine didn't; Crate didn't. That's why everywhere you turn, you see an ad proclaiming an even better hard disk deal.

During the past year, we've noticed an increasingly loud roar from drive vendors. Gimmicks abound, claims have been made that border on false advertising, and price wars are getting more intense. None of this bodes well for the consumer—not even the price competition. A cheap drive isn't such a great deal if it breaks and the company is no longer around to fix it.

For this article, Macworld Labs tested, poked, and prodded 40MB, 50MB, and 60MB drives from 31 companies. Many of the vendors are long-time players who have sent us quality products in the past, and their drives performed true to form. Other companies—such as Bay Micro Systems, Hard Drives International, and Star Data—are relatively new to the Macintosh hard drive arena; some new entrants fared well against established products, but many didn't.

### Following Tradition

Most top-rated drives come from companies that toe a traditional line—

they aren't trying to win market share solely on price or hype. Instead, they consistently pay attention to details and put together quality products. Our favorites typically offer cleanly designed formatting and diagnostic software; a sturdy, platinum-colored case that fits perfectly underneath a Macintosh SE; and informative, professionally bound (not photocopied) manuals. These drives generally aren't the cheapest, but they aren't overpriced either. Most are sold through dealers, since generally speaking, customers can get more prompt, personal service through a local dealer. (Some companies, such as GCC and Microtech International, sell drives both through dealers and direct). Drives from Apple, EMAC, GCC, Maxcess, MicroNet Technology, Microtech International, Rodime Systems, Ruby Systems, PLI, and Storage Dimensions all fall easily into the category of traditional drives. (Of course, a few drives that make our A list don't meet all the above conditions—particularly with respect to case design. For instance, we like the small, fast drives from EMAC, FWB, Liberty, and La Cie as well as SuperMac Technology's larger, vertical Data-Frame XP).

Some of the preferred drives include more than formatting and diagnostic software; partitioning and backup software are especially common. Backup software is handy for any size hard drive. A good program is fast, compresses data, lets you back up to a variety of media, and provides the ability to perform incremental backups—in short, it does all the things Apple's HD Backup doesn't. Our favorite package, Fifth Generation Systems' speedy Fast-Back II, comes bundled with Rodime's Cobra. We also like Centa Systems' Back Track, bundled with Microtech's Nova; SuperMac's DiskFit, bundled with the DataFrame; PLI's TurboBack, bundled with the PLI 50 Turbo; and, to a lesser degree, Symantec's SUM II, which comes with GCC's UltraDrive.

Partitioning software, which lets you divide a hard disk into volumes of various sizes, is probably unnecessary

for users with drives of less than 80MB. Programmers may want to divvy up the space on a hard drive in order to get around the System's 2000 or so files-per-volume limit. Other users may just like to group files on separate volumes in order to stay organized or to cut down on start-up time. Of all the drives we looked at, Storage Dimensions and SuperMac have the partitioning software with the best interface.

Only a few drives include other types of software, but the best deals are worth noting. PLI includes three utilities it developed in-house: Turbo-Optimizer reclaims the empty space on a fragmented hard disk, Turbo-Cache enables you to store hard disk data in fast system RAM, and Turbo-Spool spools print jobs. Likewise SuperMac includes its popular print spoolers, SuperSpool (for the ImageWriter) and SuperLaserSpool (for laser printers).

Most other hard drive vendors rely on bundling arrangements with software vendors. Especially popular are hard drive utilities such as Symantec's SUM II, bundled with GCC's Ultra-

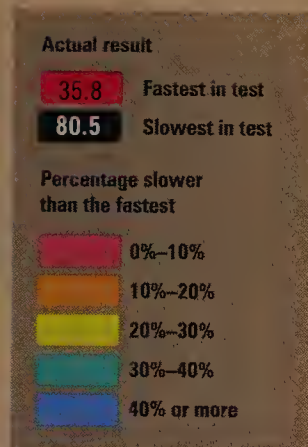


**Microtech International's Nova, Ruby Systems' StarDrive, and MicroNet Technology's Micro/Stack**

Drive; Norton Computing's Norton Utilities for Mac, bundled with Microtech's Nova and EMAC's Impact and Metro drives; and Central Point Software's MacTools, bundled with Storage Dimensions' MacinStor. With its E Series and V Series drives, Maxcess includes CE Software's QuicKeys Lite (a macro program that, unlike the standard version of QuicKeys, limits you



# MACINTOSH SE RESULTS



C = Conner CP3040  
 CP = Conner CP340  
 K = Kalok  
 Q = Quantum  
 R = Rodime  
 S = Seagate  
 W = Western Digital

Some drives that ran fast on a Macintosh II ran slower on a Macintosh SE, and vice versa. For instance, the Seagate-based GCC UltraDrive 45 ran much faster than the Quantum-based UltraDrive 40 on a Macintosh SE. But the Quantum-based UltraDrive 40 was the second-fastest drive overall on a Macintosh II. Macintosh Plus and SE owners should look at the Macintosh SE test results for guidance, while owners of faster Macs should look at the Macintosh II results.

Overall Fastest		(Seconds) Duplicate 10MB					(Kilobits per second)		
		Duplicate	Load	Save	Search	Compile	Read	Write	Seek*
1.00	FWB PocketHammer 40 (Q)	104.38	135.13	48.97	176.52	1210.50	5022	4346	23
0.99	iDS Prologue 40 (Q)	121.67	124.07	49.31	177.90	1216.44	5319	4378	22
0.99	Cutting Edge XL40 (Q)	121.00	123.06	49.07	175.47	1199.82	5016	4251	22
0.99	Ruby Systems StarDrive 40 (Q)	121.50	122.80	48.78	175.48	1202.04	4996	4226	22
0.99	La Cie ZFP 40 (Q)	120.45	123.39	48.46	176.68	1208.58	5026	4173	22
0.98	Hard Drives Int'l PowerDrive 40 (Q)	126.19	123.75	48.42	176.07	1198.52	4452	4694	24
0.98	Rodime Cobra 70 (R)	119.43	124.58	49.42	172.87	1178.20	4776	3967	20
0.97	Rodime 45 Plus (R)	123.33	122.91	48.60	179.50	1223.43	4742	4198	20
0.97	La Cie Cirrus 40 (C, Q)	124.42	123.39	49.46	176.64	1217.39	4899	4146	24
0.97	Storage Dimensions MacinStor 40 (Q)	125.52	123.63	48.82	174.43	1204.26	4451	4373	22
0.97	Advanced Gravis HardPac 40 (Q)	125.40	123.67	48.71	175.77	1209.90	4448	4391	22
0.97	PCPC MacBottom 42 (Q)	126.75	124.17	48.69	175.75	1202.77	4534	4208	22
0.96	Microtech Nova 40 (Q)	130.15	125.44	48.89	177.48	1210.56	4821	4152	23
0.96	Tallgrass TravelPac 40 (Q)	125.52	124.04	48.21	175.53	1202.92	4297	4210	22
0.96	Heart Data 40 (Q)	126.97	123.69	48.91	175.73	1196.84	4322	4189	22
0.96	Dolphin Integra 40 (Q)	128.06	124.37	48.12	175.78	1203.54	4296	4167	22
0.96	Ehman 40 (Q)	127.38	123.66	49.02	176.18	1197.40	4302	4221	22
0.96	Liberty 40 (Q)	127.95	124.90	48.58	176.38	1201.48	4285	4232	22
0.96	Ruby Systems Dwarf 40 (Q)	127.38	123.69	48.66	175.91	1219.45	4282	4204	22
0.96	EMAC Impact 40 (Q)	127.56	123.87	49.09	176.10	1199.92	4278	4215	22
0.96	MacProducts Magic Enhanced 40 (Q)	127.40	125.50	49.55	181.85	1217.87	4429	4384	22
0.95	Deltaic 40 (Q)	127.20	124.13	49.62	176.87	1208.20	4285	4225	22
0.95	GCC UltraDrive 45 (S)	107.94	125.55	49.54	175.70	1183.89	3987	3678	22
0.95	Mirror 45 (S)	130.50	123.76	49.06	176.35	1209.21	4264	4155	22
0.95	Rodime Cobra 45 (R)	126.76	125.37	50.79	178.88	1240.70	4750	3960	20
0.92	Apple Hard Disk 40SC (Q)	111.66	125.42	49.67	176.63	1234.91	3803	3294	22
0.91	Maxcess E Series 40 (Q)	133.52	125.79	49.50	176.62	1199.15	3682	3619	22
0.91	Bay Micro 40 (Q)	132.55	131.13	52.36	196.02	1275.10	4324	4246	22
0.86	MicroNet Micro/Stack 40 (C)	148.16	124.99	50.34	184.36	1255.35	3434	2890	26
0.85	La Cie ZFP 40 (C)	145.77	125.69	50.72	185.12	1240.36	3279	2933	24
0.83	Dolphin Integra 60 (S)	153.70	133.42	55.29	196.63	1289.34	3491	3457	29
0.83	MicroNet Micro/Stack 62 (S)	153.64	133.49	55.43	196.72	1291.47	3473	3432	28
0.83	Cutting Edge XL60 (S)	153.58	132.64	55.64	196.93	1293.13	3449	3412	27
0.83	Deltaic 40 (K)	150.93	134.29	56.09	196.62	1362.18	3845	3225	33
0.83	CMS Platinum 40 (C)	151.86	125.90	50.93	184.88	1265.39	3195	2442	25
0.83	SuperMac DataFrame XP60 (S)	154.07	134.25	54.88	201.00	1313.06	3464	3429	27
0.83	Ehman 60 (S)	154.38	133.05	55.63	197.07	1296.54	3433	3360	27
0.82	Western Digital Preference 40AP (W)	164.08	139.84	65.03	202.15	1467.72	4197	4013	56
0.81	iDS Pro 40 (C)	157.95	126.96	52.84	189.56	1326.21	3092	2569	25
0.78	GCC UltraDrive 40 (Q)	142.21	136.87	58.31	201.32	1358.30	2777	2776	32
0.77	Hard Drives Int'l PowerDrive 60 (S)	167.88	134.04	57.04	198.27	1305.27	2753	2751	21
0.77	Ruby Systems StarDrive 60 (S)	169.02	133.61	56.59	199.18	1299.86	2695	2692	21
0.77	Hard Drives Int'l PowerDrive 40 (S)	172.04	135.01	57.94	198.26	1333.52	2790	2791	31
0.77	Mirror 45 (Q)	172.63	134.71	57.78	198.45	1334.33	2732	2728	29
0.76	Ehman 45 (S)	174.36	135.70	57.98	199.37	1348.19	2724	2723	31
0.76	Procom 45 (S)	173.94	136.27	58.69	198.12	1353.39	2719	2719	33
0.75	MicroNet Micro/Stack 46 (S)	174.77	135.79	58.49	199.13	1414.20	2691	2691	32
0.75	PLI 50 Turbo (S)	179.54	137.33	58.96	200.75	1373.89	2719	2719	43
0.75	Relax Hard Plus 46 (S)	178.23	137.43	59.05	205.66	1386.37	2785	2781	37
0.74	iDS Pro 50 (S)	178.82	137.78	59.67	204.28	1419.30	2748	2748	44
0.74	MacProducts Magic Enhanced 60 (S)	177.15	135.65	58.45	205.17	1376.15	2074	2778	38
0.69	Heart Data 60 (S)	210.12	137.63	60.17	198.55	1323.92	1861	1859	21
0.68	Hard Drives Int'l PowerDrive 40 (CP)	216.88	138.69	61.52	197.13	1358.80	1877	1885	28

\*Seek results are not included with other tests for the overall index.



to 14 keystrokes), DiskTop (a useful file-management program), and Mock-Package (a group of utilities, including a text editor and background printer). The PCPC MacBottom drive comes with a nifty utility that lets you copy a single large file onto a couple of floppy disks and then restore the file on another Mac.

### Less Traditional but Still Loved

Not all of the drives we like best take as traditional an approach as the ones listed above. Take the creative design approach adopted by La Cie. The king of consumer choice, La Cie sells three lines of drives—Cirrus, Tsunami, and ZFP (which stands for zero footprint; the unit fits beneath a Macintosh SE). The company's original drive, the Cirrus, has an oddly rounded case that stands vertically beside a Mac (see photo). Nonetheless, the Cirrus has always been a quiet, fast performer. La Cie's latest creation, the Tsunami, looks even odder—wavelike scallops undulate along its bottom edges and a round, purple fan bulges out at the top (see photo). This drive maintains the Cirrus's speed and silence, and some people appreciate its unusual look.

But La Cie hasn't stopped at simply offering three different case designs. Consumers can choose either a Quantum or Conner mechanism when purchasing any 40MB drive. The mechanism you pick determines the length of the warranty (five years for Quantum, one for Conner) and the price you pay (\$50 to \$100 more for a Quantum). Where you purchase your drives may determine which one you get—La Cie sells Cirrus and ZFP drives directly; you must purchase Tsunami drives through dealers.

Even more clever in this age of concern about customer support for hard drives, La Cie offers free on-site service to purchasers of the Tsunami drive. If you have a problem, you call La Cie, which in turn calls TRW, which calls you to set up a time to visit your office. TRW then either replaces or repairs the faulty drive. Although this is really no quicker than getting a company with a guaranteed turnaround time to send you a replacement unit, it does save you the hassle of shipping the drive.

La Cie isn't the only vendor to offer special features or additional choices in order to distinguish itself from the crowd. Some innovations, such as La Cie's longer warranties for the Quantum-based drives, may truly represent a good deal. Others are a bit trickier to evaluate. For instance, EMAC's sturdy Metro drives include SCSI Sentry, a protective circuit that prevents a drive's controller from being damaged due to a short in the SCSI circuitry. Shorts in the SCSI circuitry are infrequent, however. You'd have to do something unusual, like poke a paper clip into the holes of the SCSI connector on the back of a Mac, in order to short out a SCSI circuit. Still, people have been known to do worse things to their Macs, and a little extra protection might not be a bad idea.

Just be careful not to get swept away by features you can't really use. For instance, some companies, such as Mirror and MacProducts, include several megabytes of shareware on their drives. While that may seem like a good deal at first, it's frustrating to plug in a new 40MB drive only to find out that 5MB or more have been filled up with miscellaneous demonstration programs (in other words, advertising), games you don't want, or outdated virus-protection programs.

### Small and Mobile

In the June issue we first reported on a new crop of small, lightweight drives that draw their power from the Mac's floppy port (see "Midrange Hard Disks," *Macworld*, June 1990). Because many of the drives had trouble booting from fast Macs such as the IICx, and because they won't run on a Macintosh II (which doesn't have a floppy port), we hesitated to recommend them to anyone other than Mac Portable users. Over the past few months, however, some companies have solved these problems.

Of the floppy-port-powered drives we tested this time, only Advanced Gravis's HardPac and Tallgrass Technologies' TravelPac failed to boot from a Macintosh IICx with an internal drive.



iDS's Pro, La Cie's Cirrus, and Liberty Systems' Liberty

The others—the Dolphin Systems Porta, iDS Pro, iDS Wip (an even smaller version of the iDS Pro), Relax Sierra, MacProducts Sierra, MicroNet Technology Micro Pack, and Ruby Systems Dwarf—all worked fine. In answer to our complaint that none of the drives would run on a Macintosh II without adding an external power supply (and thereby negating the size and weight advantages these drives hold), iDS now includes an adapter.

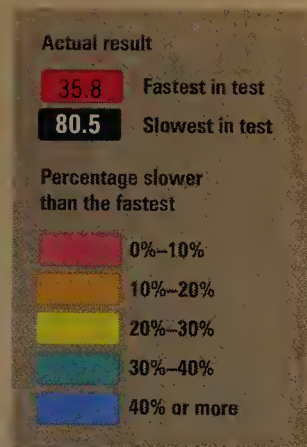
Since these drives have become better behaved, we are more inclined to recommend them, although we still find them best suited to Macintosh Portable users. The MicroNet Micro Pack supports the Portable's sleep mode—when not in use this drive powers down so as to conserve the battery. Our favorite drives without a power supply include the fast iDS Pro, the very tiny iDS Wip, MicroNet's Micro Pack, and Ruby Systems' Dwarf (which includes numerous ventilation holes to prevent heat buildup). Each of these drives is a solid performer and extremely quiet (thanks to the lack of a fan or power supply).

### Bargain Hunting

If you're looking for a low, low price per megabyte, a number of companies are glad to oblige. These discounters generally sell direct, but although they offer the basic cables and formatting software you need to get a drive up and running, they offer little in the way of extras. In addition, these companies count on buying mechanisms in bulk from a variety of suppliers in



# MACINTOSH II RESULTS



C = Conner CP3040  
 CP = Conner CP340  
 K = Kalok  
 Q = Quantum  
 R = Rodime  
 S = Seagate  
 W = Western Digital

In order to determine the overall fastest and slowest drives, we added up the numbers from the real-life tests for each drive and indexed them based on the fastest drive. These indexed numbers are shown in the farthest left-hand column. We then grouped the drives according to how much slower they were overall than the fastest drive. For instance, the drives coded with red are 0 to 10 per cent slower. Actual results for individual tests are also shown and color coded. The drive that ran fastest and the drive that ran slowest in each test are also marked.

## Overall Fastest

		(Seconds) Duplicate 10MB	Load	Save	Search	Compile	(Kilobits per second) Read	Write	Seek*
1.00	Rodime Cobra 70 (R)	75.76	45.52	20.52	53.58	480.65	7151	6362	19
0.98	GCC UltraDrive 40 (Q)	70.25	48.04	24.02	50.00	466.46	6430	6438	21
0.97	Rodime Cobra 45 (R)	78.53	46.51	21.53	54.02	504.12	6991	6275	19
0.97	Microtech Nova 40 (Q)	67.05	47.30	22.64	50.74	484.57	5868	5860	22
0.96	Rodime 45 Plus (R)	81.92	45.54	21.09	53.53	494.94	6476	5981	19
0.95	FWB PocketHammer 40 (Q)	74.32	47.06	23.54	50.18	493.24	6029	6026	22
0.95	MacProducts Magic Enhanced 40 (Q)	88.04	47.60	23.39	52.09	487.40	6525	6536	22
0.95	Storage Dimensions MacinStor 40 (Q)	90.66	46.94	23.45	50.22	482.86	6372	6444	21
0.95	Advanced Gravis HardPac 40 (Q)	92.19	47.45	23.34	50.65	492.18	6498	6531	22
0.95	Apple Hard Disk 40SC (Q)	72.27	47.50	24.20	50.77	493.51	5882	5954	21
0.94	iDS Prologue 40 (Q)	90.40	47.88	23.52	50.97	490.15	6450	6475	22
0.94	iDS Pro 40 (C)	88.23	48.75	22.60	59.94	532.25	7240	7058	24
0.94	Hard Drives Int'l PowerDrive 40 (Q)	93.43	47.17	24.00	50.08	496.36	6499	6523	22
0.94	PCPC MacBottom 42 (Q)	88.47	47.13	22.31	50.69	488.08	5970	5962	21
0.93	Heart Data 40 (Q)	91.01	47.20	22.77	50.37	485.90	6059	6046	22
0.93	Ruby Systems StarDrive 40 (Q)	91.05	47.48	23.23	50.07	482.49	5964	5963	22
0.93	EMAC Impact 40 (Q)	91.85	46.85	23.33	50.18	481.66	5971	5957	22
0.93	Maxcess E Series 40 (Q)	92.69	48.23	23.53	50.31	470.94	5981	6011	22
0.93	Liberty 40 (Q)	92.08	47.51	23.47	50.71	480.08	6010	5994	22
0.93	La Cie ZFP 40 (Q)	89.97	46.97	24.00	50.23	488.44	5994	5993	21
0.92	Dolphin Integra 40 (Q)	95.72	47.06	23.31	50.23	491.66	6016	6011	22
0.92	Tallgrass TravelPac 40 (Q)	89.39	47.57	23.57	50.23	500.07	5964	5915	22
0.92	Ruby Systems Dwarf 40 (Q)	92.25	47.56	23.50	50.06	485.04	5906	5846	22
0.92	Cutting Edge XL40 (Q)	91.00	48.10	24.03	50.13	492.20	6002	5991	21
0.92	Mirror 45 (Q)	97.47	47.08	23.70	50.34	489.24	5931	6014	22
0.92	La Cie Cirrus 40 (C, Q)	88.84	48.39	23.39	59.41	543.22	6673	6656	23
0.91	Ehman 40 (Q)	94.60	47.48	24.79	50.35	496.17	5989	5964	22
0.91	Deltaic 40 (Q)	92.61	47.04	23.64	50.39	497.73	5856	5646	21
0.89	MicroNet Micro/Stack 40 (C)	90.62	47.96	23.29	59.41	529.29	6668	5271	25
0.84	CMS Platinum 40 (C)	93.33	48.63	23.82	59.58	541.29	5720	4476	25
0.84	La Cie ZFP 40 (C)	95.08	49.16	24.58	59.54	545.34	5230	5081	25
0.83	MicroNet Micro/Stack 62 (S)	98.85	56.21	28.29	70.77	566.50	6362	6358	29
0.83	Bay Micro 40 (Q)	96.78	54.91	29.83	70.48	551.13	6056	6019	22
0.82	Dolphin Integra 60 (S)	98.39	56.21	28.50	72.61	567.88	6256	6249	28
0.82	Cutting Edge XL60 (S)	96.07	56.57	28.94	72.46	556.15	6107	6049	26
0.82	Ehman 60 (S)	98.28	55.93	28.23	72.84	569.64	6099	6024	26
0.76	Hard Drives Int'l PowerDrive 60 (S)	105.85	56.35	29.04	73.17	571.25	4980	4968	21
0.76	Ruby Systems StarDrive 60 (S)	106.01	56.20	28.38	73.32	551.56	4796	4785	21
0.75	Heart Data 60 (S)	107.09	56.51	28.89	73.22	553.81	4696	4681	21
0.74	GCC UltraDrive 45 (S)	92.61	58.73	34.38	75.81	606.58	5086	5088	34
0.74	Mirror 45 (S)	112.58	57.46	30.63	73.41	598.02	4912	4908	31
0.74	PLI 50 Turbo (S)	111.53	58.43	31.14	73.26	599.76	4905	4910	32
0.73	Procom 45 (S)	112.85	58.39	30.68	73.16	602.42	4867	4866	33
0.73	Deltaic 40 (K)	109.61	59.20	32.24	71.53	630.84	5354	4438	32
0.73	Hard Drives Int'l PowerDrive 40 (S)	112.70	57.99	34.31	73.73	604.46	5099	5099	34
0.72	Ehman 45 (S)	113.07	58.57	32.06	74.51	606.97	4890	4889	31
0.72	MacProducts Magic Enhanced 60 (S)	112.59	58.11	31.29	75.30	600.82	4853	4600	38
0.72	MicroNet Micro/Stack 46 (S)	114.19	58.55	32.57	75.02	607.26	4796	4797	33
0.72	Relax Hard Plus 46 (S)	118.17	58.64	34.62	75.47	615.07	5107	5088	36
0.72	Hard Drives Int'l PowerDrive 40 (CP)	118.65	58.52	30.93	72.54	584.63	4369	4540	27
0.71	iDS Pro 50 (S)	113.86	59.14	34.95	77.11	636.04	4998	4990	41
0.67	SuperMac DataFrame XP60 (S)	127.84	58.48	31.30	74.72	583.83	3506	3510	27
0.64	Western Digital Preference 40 (W)	137.61	66.30	38.51	77.76	743.45	4459	4427	56

\*Seek results are not included with other tests for the overall index.



## A CONSUMER'S GUIDE TO LOW-CAPACITY DRIVES

	Product	40MB Drives <sup>1</sup>	45MB-50MB Drives <sup>1</sup> (capacity/mechanism/price)	60MB-70MB Drives <sup>1</sup>	Internal Versions	Method of Sale	Takes Power from Floppy Port	Dimensions (h x w x d, in inches)	Case Material
Advanced Gravis	HardPac	40/Q/\$995			no	via dealer	yes	2 x 4 x 7.2	plastic
Apple Computer	Hard Disk 40SC	40/Q/\$1299, 40/S/\$1299			yes	via dealer	no	3.1 x 9.7 x 10.5	plastic
Bay Micro Systems	Bay Micro	40/Q/\$525			yes <sup>3</sup>	direct	no	3 x 9.5 x 9.75	plastic
CMS	Platinum	40/C/\$919			yes	via dealer	no	2 x 9.8 x 10.5	metal
Cutting Edge	XL	40/Q/\$849	45/S/\$749	60/S/\$799	yes	via dealer	no	2.3 x 9.75 x 9.8	metal
Deltaic Systems	Deltaic	40/K/\$699, 40/Q/\$799			yes <sup>3</sup>	direct/dealer	no	2.3 x 9.7 x 9.7	metal or plastic
Dolphin Systems	Integra	40/Q/\$838	47/S/\$820	60/S/\$1011	yes	via dealer	no	2.5 x 13 x 14.5	metal
	Porta	40/C/\$881			yes	via dealer	yes	2 x 4 x 7	metal
Ehman	Ehman	40/Q/\$459	45/S/\$399	60/S/\$499	yes	direct	no	2.3 x 9.75 x 9.8	metal
EMAC	Impact	40/Q/\$829			yes	via dealer <sup>5</sup>	no	2.5 x 6 x 10.5	plastic
	Metro	40/Q/\$849			yes	via dealer <sup>5</sup>	no	2.8 x 9.7 x 10.7	plastic
FWB	PocketHammer	40/Q/\$950			yes <sup>3</sup>	via dealer	no	6.5 x 3 x 9	metal
GCC Technologies	UltraDrive	40/Q/\$799	45/S/\$699		yes <sup>3</sup>	direct/dealer	no	2.75 x 9.5 x 10.75	plastic
Hard Drives International	PowerDrive	40/S/\$399, 40/CP/\$429		60/S/\$449	yes	direct	no	2.5 x 3.75 x 9.75	metal
		40/Q/\$459							
Heart Data Corporation	Heart Data	40/Q/\$769		60/S/\$899	yes	direct/dealer	no	3 x 9.5 x 11	metal
iDS	Prologue	40/Q/\$835, 40/C/\$835	50/S/\$835		yes	via dealer	no	3 x 10 x 11	metal
	Pro	40/Q/\$725, 40/C/\$725	50/S/\$725		yes	via dealer	yes	2 x 4.7 x 7.9	plastic
	Wip	40/C/\$725			yes	via dealer	yes	1.3 x 4.7 x 7.9	plastic
La Cie	Cirrus	40/C/\$529, 40/Q/\$579	50/Q/\$659		no	direct	no	6.5 x 2.5 x 9	plastic
	Tsunami	40/C/\$699, 40/Q/\$799	50/Q/\$899		no	via dealer	no	2 x 6 x 8	plastic
	ZFP	40/C/\$479, 40/Q/\$529	50/Q/\$599		no	direct	no	3.5 x 10 x 10.5	plastic
Liberty Systems	Liberty 40	40/Q/\$699			no	direct	no	2 x 5 x 7	metal
MacProducts	Basic Series	40/C/\$429, 40/Q/\$429	46/S/\$409, 50/Q/\$479	60/S/\$549	yes	direct/dealer	no	2.25 x 9.5 x 9.5	metal
	Magic Enhanced	40/C/\$479, 40/Q/\$479	46/S/\$459, 50/Q/\$529	60/S/\$599	no	direct/dealer	no	2.25 x 9.5 x 10.5	metal
	Sierra	40/C/\$479, 40/Q/\$479	46/S/\$459, 50/Q/\$529		no	direct/dealer	yes	5.25 x 2.5 x 7.75	metal
Maxcess	E Series	40/Q/\$995			yes	via dealer	no	2.4 x 9.5 x 9.75	metal
	V Series	40/Q/\$995			yes	via dealer	no	6.5 x 3 x 8.25	metal
MicroNet Technology	Collegiate Pack	40/C/\$749				via dealer	no	2.25 x 6.25 x 7.75	metal
	Micro Pack	40/C/\$725	46/S/\$649		yes <sup>3</sup>	via dealer	yes	2 x 5 x 9.25	metal
	Micro/Stack	40/C/\$925	46/S/\$849	62/S/\$989	yes	via dealer	no	3.13 x 10 x 10.38	metal
Microtech International	Nova	40/Q/\$649			yes	direct/dealer	no	2.5 x 9.7 x 10.5	plastic
Mirror Technologies	Mirror		45/S/\$497	60/S/\$627	yes	direct	no	2.5 x 9.7 x 10.85	metal
PCPC	MacBottom	42/C/\$579			yes	direct/dealer	no	2 x 9.7 x 9.5	plastic
		42/Q/\$579							
PLI	PLI 50 Turbo		50/S/\$799		yes	via dealer	no	2.4 x 9.8 x 9.8	plastic
Procom Technology	Procom		45/S/\$845		yes	via dealer	no	2.25 x 9.7 x 10.25	plastic
Relax Technology	Hard Plus		46/S/\$699		yes <sup>3</sup>	via dealer	no	2.6 x 10.2 x 10.8	metal
	Sierra		46/S/\$619		yes <sup>3</sup>	via dealer	yes	5.5 x 2.2 x 7.5	metal
Rodime Systems	45 Plus		45/R/\$1299		yes	via dealer	no	2.9 x 9.7 x 10.4	plastic
	Cobra		45/R/\$1399	70/R/\$1599	yes	via dealer	no	2.5 x 9.7 x 10.4	plastic <sup>7</sup>
Ruby Systems	Dwarf	40/Q/\$875	45/S/\$759	60/S/\$899	yes	via dealer	yes	2.25 x 7 x 4.25	plastic
	StarDrive	40/Q/\$925	45/S/\$799	60/S/\$939	yes	via dealer	no	2.5 x 10 x 10.5	plastic
Storage Dimensions	MacinStor	40/Q/\$1269			yes <sup>3</sup>	via dealer	no	3 x 9.7 x 15	plastic
SuperMac Technology	DataFrame XP			60/S/\$1199	no	via dealer	no	8 x 3 x 9.5	metal
Tallgrass Technologies	TravelPac	40/Q/\$1195			no	via dealer	yes	2 x 4.6 x 7.2	plastic
Western Digital	Preference 40AP	40/W/\$999			no	via dealer	no	3.1 x 6.8 x 8.1	plastic

<sup>1</sup> C = Conner CP3040, CP = Conner CP340, K = Kalok, Q = Quantum, R = Rodime, S = Seagate, W = Western Digital. <sup>2</sup> This service is provided by dealers. <sup>3</sup> No internal version for the Macintosh Plus. <sup>4</sup> Depends on the mechanism. <sup>5</sup> Direct to educational institutions. <sup>6</sup> Two years if you purchase a carrying case. <sup>7</sup> Case includes power switches on front for controlling other peripherals and the Macintosh CPU. <sup>8</sup> With extended warranty.



Type of Termination	Partitioning Software	Backup Software	Password-Protection Software	Other Commercial Software	Warranty (in years)	Extended Warranty Available	Toll-free Telephone Support	Guaranteed Turnaround Time	Data Recovery upon Request	User Specifies Mechanism
internal	yes	no	yes	no	1	no	yes	2 weeks	yes	yes
external	yes	HD Backup	no	no	1	yes	no	none	no <sup>2</sup>	no
internal	no	HD Backup	no	no	2	yes	no	72 hours <sup>2</sup>	yes	yes
internal	no	no	no	no	1	yes	no	none	yes	no
internal	no	DS Backup	no	MacTree Plus	1	no	no	none	yes	no
external	no	no	no	no	1	yes	no	none	yes	yes
internal	yes	HD Backup	no	no	1-2 years <sup>4</sup>	yes	no	48 hours <sup>2</sup>	yes	yes
internal	yes	HD Backup	no	no	1	yes	no	48 hours <sup>2</sup>	yes	yes
internal	no	DS Backup	no	MacTree Plus	1	no	no	none	yes	no
external	yes	HD Backup	yes	Norton Utilities for Mac	2	no	no	5 days	yes	no
external	yes	HD Backup	yes	Norton Utilities for Mac	2	no	no	5 days	yes	no
internal	yes	HD Backup	yes	Hard Disk Deadbolt, Hard Disk Utilities	1	yes	no	48 hours	yes	no
external	yes	SUM II	yes	Quick Spool II	2	yes <sup>2</sup>	yes	none	yes	yes
internal	yes	no	yes	no	1	no	no	48 hours	no	yes
internal	yes	no	no	no	2	yes	yes	2 days	yes	yes
internal	no	HD Backup	yes	PackIt III	2-5 <sup>4</sup>	no	yes	24 hours	yes	yes
internal	no	HD Backup	yes	PackIt III	2-5 <sup>4</sup>	no	yes	24 hours	yes	yes
internal	no	HD Backup	yes	PackIt III	2-5 <sup>4</sup>	no	yes	24 hours	yes	yes
internal	yes	HD Backup	yes	no	1-5 <sup>4</sup>	no	yes	72 hours	yes	yes
switchable	yes	HD Backup	yes	no	1-5 <sup>4</sup>	no	yes	72 hours	yes	yes
internal	yes	HD Backup	yes	no	1-5 <sup>4</sup>	no	yes	72 hours	yes	yes
internal	FileLock	HD Backup	yes	no	1 <sup>6</sup>	no	no	48 hours	yes	no
internal	no	HD Backup	no	SmartCache	1-2 <sup>4</sup>	yes	no	none	yes	yes
internal	no	HD Backup	no	SmartCache	1-2 <sup>4</sup>	yes	no	none	yes	yes
internal	no	HD Backup	no	SmartCache	1-2 <sup>4</sup>	yes	no	none	yes	yes
internal	yes	no	yes	QuicKeys Lite, DiskTop, MockPackage	2	no	yes	24 hours	yes	yes
internal	yes	no	yes	QuicKeys Lite, DiskTop, MockPackage	2	no	yes	24 hours	yes	yes
internal	yes	no	yes	no	1	yes	no	48 hours	yes	yes
internal	yes	no	yes	no	1	yes	no	48 hours	yes	yes
internal	yes	no	yes	no	1	yes	no	48 hours	yes	yes
internal	yes	Back Track	no	Norton Utilities for Mac	5	no	yes	24 hours	yes	yes
internal	yes	Volume Back	no	no	2	yes	no	5 days <sup>8</sup>	yes	yes
internal	no	no	no	SCSI Floppy	2	yes	no	48 hours <sup>8</sup>	yes	no
internal	yes	TurboBack	no	TurboCache, TurboSpool, TurboOptimizer	1	yes	yes	48 hours <sup>2</sup>	yes	yes
switchable	yes	no	yes	no	1	no	no	24 hours <sup>2</sup>	yes	no
external	yes	Relax & Save	yes	no	1	no	yes	none	yes	yes
external	yes	Relax & Save	yes	no	1	no	yes	none	yes	yes
internal	yes	no	yes	no	1	no	no	72 hours	no	yes
internal	yes	FastBack II	yes	no	1	no	no	72 hours	no	yes
internal	yes	no	yes	no	1	yes	yes	48 hours	yes	yes
internal	yes	no	yes	no	1	yes	yes	48 hours	yes	yes
external	yes	MacTools	yes	MacTools	2	no	no	24 hours	yes	yes
internal	yes	DiskFit	yes	SuperSpool, SuperLaserSpool	1	no	no	72 hours	no	no
internal	yes	no	yes	Disk Tools Plus	2	yes	yes	24 hours	no	yes
internal	no	no	no	no	1	no	yes	48 hours	yes	no



order to keep their price to the consumer down. Thus, month to month, the mechanisms they have available may come from different makers.

Of the discounters, Ehman and Hard Drives International provide the best products, although the quality can still be spotty. For instance, if you read our hard drive roundup in the June issue, you'll know that the Ehman drives caused us no end of problems, while the Hard Drives International PowerDrive worked fine. This time around, all of Ehman's drives were average performers but the Conner CP340-based PowerDrive was unacceptably slow.

The CP340-based PowerDrive also required some work to format. When attached to a Macintosh SE, the drive should have run fastest at a 2:1 inter-

leave ratio. Instead, we recorded faster times when the drive was formatted at a 3:1 ratio—the ratio that is normally more appropriate for a Mac Plus.

Both Ehman and Hard Drives International are working to improve the quality of their products and their support. For instance, Ehman has cleaned up its formatting software and has hired more customer service representatives. We'll continue to follow these companies to see if the changes work. Two other companies, MacProducts and Relax, could also be considered discounters since their prices are generally low. Relax, however, sells through dealers only, while MacProducts sells both through dealers and direct. In "Midrange Hard Disks" we reported problems copying files and folders on Relax and MacProducts

drives, a problems we attributed to Relax's driver software (which MacProducts licenses). Out of interest, we double-checked some of the 80MB drives we had originally tested. Neither these nor any of the 40MB to 60MB drives we tested this time had difficulty copying files. Whatever the initial problem was—whether driver related or mechanism related—it seems to have been fixed.

Other discounters didn't do well either in our benchmark tests or in our subjective review. We wouldn't touch Star Data's StarMac with a ten-foot SCSI cable, much less attach it to our Macs. The problems started immediately after we formatted the drive. The StarMac wouldn't mount. We had to restart the Mac every time in order to get the drive to show up on the

## DO-IT-YOURSELF TERMINATION

**N**early every time we publish a review of hard drives, we complain about drives with internal termination. Apple requires that the first and last peripherals attached to a Mac's SCSI port be terminated—echoes from electronic signals passed through the cable must be deadened. Since many hard drive compa-



nies bank on the fact that a hard drive will be the first (and only) peripheral in a chain, they add termination. For a first-time Mac user, this makes a hard drive a plug-and-play proposition.

But for anybody with a couple of other SCSI peripherals attached, dealing with termination can be a nightmare. If you've

already got, say, an internal drive (which is terminated) and an internally terminated tape backup drive hanging off the SCSI port, and you want to add a hard drive that a vendor has so kindly terminated for you, here's what to do.

First of all, check out what type of termination the drive has. If the drive comes with a small 50-pin adapter, then you're lucky—you've picked a drive that is externally terminated. Otherwise you'll need to remove the internal terminators.

You'll need to know what you are looking for. Internal terminators look like tiny pieces of plastic with little metal legs sticking out. You see only the plastic tops; the legs are firmly secured inside the drive.



Most drives don't allow easy access to terminators; you need to open the drive's case with a small Phillips screw-

driver. Some cases, such as those with Ehman drives, have a piece of clear plastic that lets you see the terminators. Removing the plastic allows easy access to the terminators.

Once the case is open, you need a pair of pliers to remove the terminators. If you ever played the game of Operation as a child, you know what this procedure feels like. Grasp the terminators firmly with the pliers and pull them straight out, gently. I never was very good at Operation, and I usually end up bending the pins on at least one of the terminators. That won't hurt the drive, but you'll never be able to reinsert a bent terminator.

That's it. Close up the drive's case and you're done. If you ever need to terminate the drive, you'll have to put the terminators back in (assuming you are more skilled at removing them than I am). An external terminator won't work because internal and external terminators have different SCSI power requirements.



desktop, and we never did get the drive to work as a start-up disk. When we finally got the StarMac mounted, it said we had used 29,472K on the disk with 0 files. Only by erasing the drive from the File menu could we get a correct reading. To top things off, the StarMac uses the same Conner CP340 mechanism that the problem PowerDrive does and, as a result, had the same formatting and speed problems. True to form, however, the StarMac's software wouldn't let us change the drive's interleave ratio.

For the real kicker, we could never reach Star Data after our initial product order (the telephone number had been disconnected). The point here is that you should be cautious when it comes to bargain hunting. If the lowest price per megabyte is your main criterion, pick a product from a more widely known company such as Ehman or Hard Drives International. At least you know that the drive comes with all the cables and software you need to get started. Some no-name discounters may try to cut corners by omitting SCSI and power cables. In addition, both Ehman and Hard Drives International are trying to provide quality products at a low price, although they have not yet reached the level of consistency of companies that put attention to detail over price per megabyte. If you want to try a product that this article doesn't review, try asking online-service users for their recommendations. Future articles on hard drives in *Macworld* will review products from companies such as Third Wave and Alliance Peripheral Systems that have been getting good notice on some of these services.

## Recommendations

As always, there's a smattering of drives we would avoid, a few that we like best, and a whole slew that fall somewhere in between. We didn't have much luck with the slow, problem-plagued Conner CP340-based Hard Drives International PowerDrive. Don't get this mechanism confused with the Conner CP3040, however. The extra 0 in the number scheme makes a big difference—CP3040-based drives were winners, fast and quiet.

Other drives to avoid include the slow, feature-poor Western Digital

Preference 40AP and the noisy Dolphin Integra 60 (the other Dolphin drives didn't jangle our nerves at all, however). A newcomer, Deltaic's 40MB drive with a Kalok mechanism, was noisy when seeking data and wouldn't always work as a start-up disk. (Deltaic's 40MB drive with a Quantum mechanism worked just fine, however.) Drives with a Seagate mechanism are also not highly favored. They are a bit cheaper than Quantum and Conner mechanisms, and they do give you a couple of extra megabytes of drive space, but they tend to be slower and noisier.

In spite of our complaints, we found several drives that we really liked—and, not surprisingly, we've picked many of these drives as winners before. GCC's fast UltraDrives are top on the list with a sleek case; excellent, clear manuals; and the inclusion of SUM II. Storage Dimensions' MacinStor drives are consistently reliable, with clean formatting software and the MacTools hard drive utility. We also liked the well-designed, reliable MicroNet drives and the speedy Rodime Cobra. The slender Cobra has some nice touches, such as an on-screen, simulated LED indicator. Both the EMAC Metro and Microtech Nova drives include Norton Utilities for Mac, the easiest to use of all the hard drive-utility packages. The Nova drive also includes nice backup software, while the Metro drive has a handy power switch on the front of the case. And yes, we still love the funky, fast La Cie Cirrus and Tsunami drives. Their silence is a big plus, as are their low prices and wide variety of mechanism and warranty options. For users looking for portability, we recommend the small, fast, lightweight Liberty drives.

Numerous other drives walk the middle line between being top picks and being not recommended. There is nothing wrong with these drives, it's just that there are so many products to choose from that even a couple of nice touches can move a drive from being a fine, solid product into being a top-rated drive. Perhaps the competition will give consumers ever better products from which to choose. ■

See *Where to Buy* under Hard Disks for contact information.

# NOISE

Color coding indicates the number of times louder each drive is than the quietest drive. For every 3-decibel increase, humans perceive sound to be twice as loud. *!! Ngn...*

	1-2 times
iDS Pro 40 (C)	34.8
Deltaic 40 (Q)	36.7
Liberty 40 (Q)	37.2
Heart Data 60 (S)	37.4
Heart Data 40 (Q)	38.1
Ehman 40 (Q)	38.2
GCC UltraDrive 45 (S)	38.6
Advanced Gravis HardPac 40 (Q)	38.9
Tallgrass TravelPac 40 (Q)	38.9
GCC UltraDrive 40 (Q)	39.9
Cutting Edge XL40 (Q)	40.4
iDS Pro 50 (S)	40.5
Mirror 45 (Q)	40.7
Rodime Cobra 45 (R)	40.8
FWB PocketHammer 40 (Q)	40.8
Maxcess E Series 40 (Q)	40.8
Mirror 45 (S)	40.9
Procom 45 (S)	40.9
SuperMac DataFrame XP60 (S)	40.9
La Cie ZFP 40 (C)	41.0
iDS Prologue 40 (Q)	41.1
EMAC Impact 40 (Q)	41.1
CMS Platinum 40 (C)	41.1
MicroNet Micro/Stack 62 (S)	41.1
Microtech Nova 40 (Q)	41.2
Storage Dimensions MacinStor 40 (Q)	41.4
Ruby Systems Dwarf 40 (Q)	41.5
Ruby Systems StarDrive 60 (S)	41.6
MacProducts Magic Enhanced 40 (Q)	41.9
Apple Hard Disk 40SC (Q)	42.3
MicroNet Micro/Stack 40 (C)	42.4
Ehman 45 (S)	42.4
Hard Drives Int'l PowerDrive 40 (CP)	42.5
Western Digital Preference 40 (W)	42.5
La Cie ZFP 40 (Q)	42.6
Rodime Cobra 70 (R)	42.7
Cutting Edge XL60 (S)	42.7
Ehman 60 (S)	42.9
MacProducts Magic Enhanced 60 (S)	42.9
MicroNet Micro/Stack 46 (S)	43.4
Dolphin Integra 40 (Q)	43.5
Bay Micro 40 (Q)	43.9
Relax Hard Plus 46 (S)	44.1
Ruby Systems StarDrive 40 (Q)	44.2
Hard Drives Int'l PowerDrive 60 (S)	44.3
PCPC MacBottom 42 (Q)	44.9
Hard Drives Int'l PowerDrive 40 (Q)	46.1
Hard Drives Int'l PowerDrive 40 (S)	46.8
PLI 50 Turbo (S)	48.8
Rodime 45 Plus (R)	49.7
Dolphin Integra 60 (S)	53.9

The key to the letters in parenthesis is with the speed results



# LIFE ONLINE

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*Wherein our man of the moment tries to live by a modem alone*

The ads are enough to make the average efficiency-monger's mouth water. "Join the Information Age," they beckon. "Use your Macintosh to connect with the real world. Correspond, fax, buy, sell, meet, bank, and shop—without stirring from your ergonomic desk chair!"

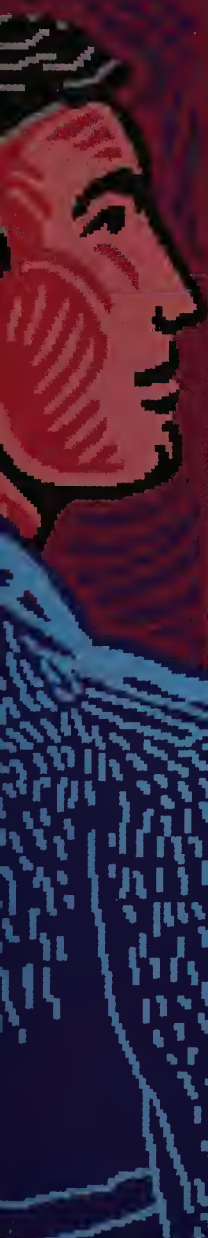
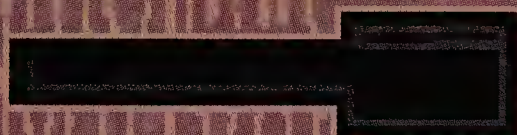
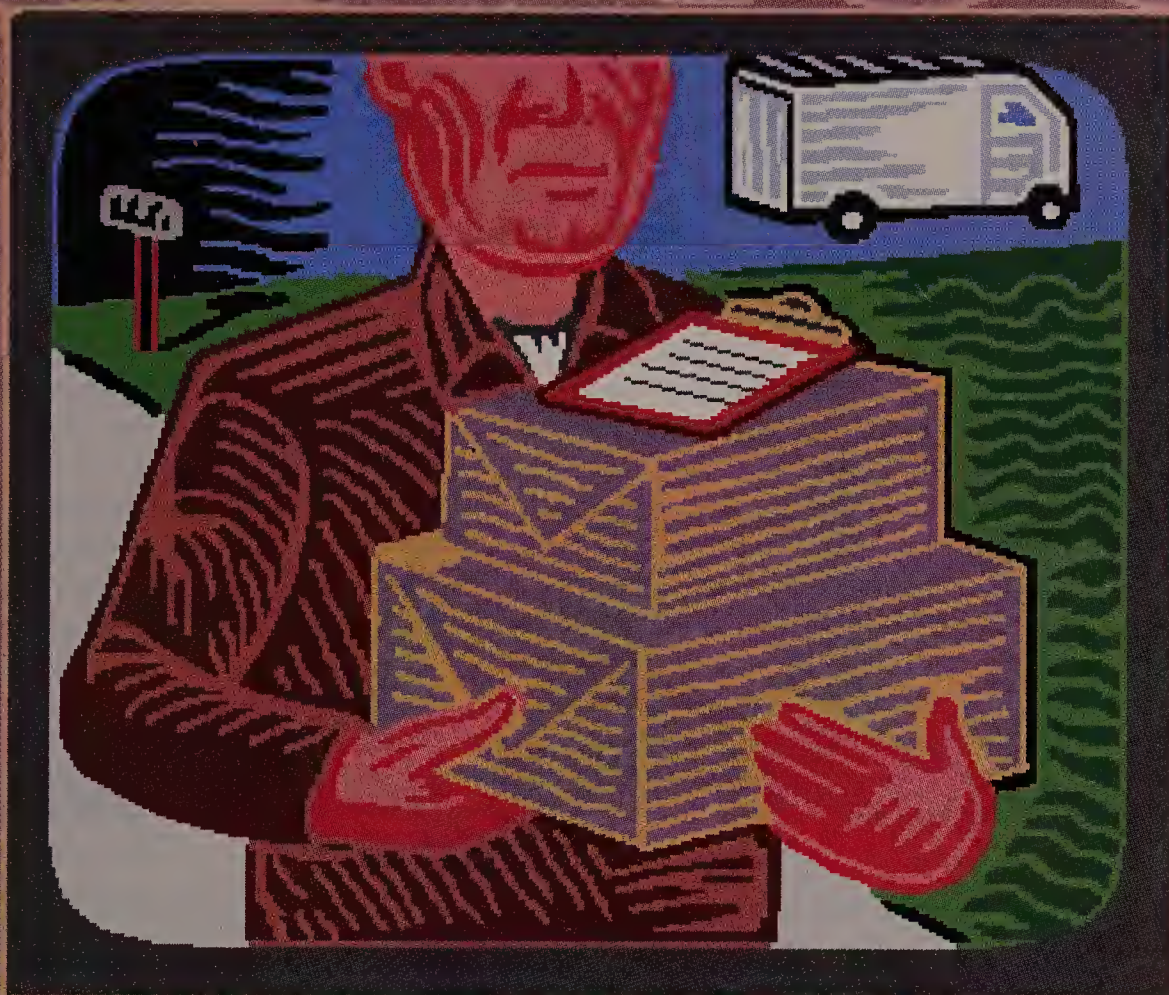
The products advertised are, of course, online information services. Anyone with a Mac and a modem can dial one up, usually paying by the hour, and connect to a distant roomful of mainframe computers—and thereby to a national network of other users. Such services now number in the dozens, each billing itself as the computer owner's ideal link to a world of information and services.

Having been sufficiently enticed by such ads, I made up my mind to greet the challenge of online services with an open mind (and a valid credit card). As a matter of fact, I decided it wasn't enough just to meander hopelessly through computerized jungles; if I was to emerge from this experience a better man, I would have to truly master my craft. Therefore, I vowed to try the Information Age on for size: I'd attempt to live for an entire week without leaving the apartment. Yes, I would shop, correspond, conduct business, and even socialize, with a modem as my sole link to the outside world.

I armed myself with a 4-foot stack of manuals, promotional materials, and directories provided by the seven general-purpose networks I'd joined: CompuServe,

**BY DAVID POGUE**







America Online, Prodigy, GENie, Delphi, BIX, and Connect. One end of my 2400-baud modem was connected to a phone line; the other was plugged firmly into my Mac. Here, then, is the account of that week—a daily journal of my life online.

## SUNDAY

My first thought, of course, was of breakfast. As it happens, you can order almost any consumer item from almost any of the online services—but you can order groceries from only one of them (and then only if you live in a big city). First stop: Prodigy.

Unlike some of the online services, Prodigy comes with its own software, which I promptly launched. My screen went black; when a picture returned, the familiar signposts of the Macintosh interface (menus, gray backdrop, windows) were gone. Instead, in a strange font I'd never seen before, the screen read, "Please enter your ID."

I entered my unchangeable, not-very-mnemonic ID number: GVJT71A. While I waited for the modem to dial the service, I reflected gratefully on the fact that reaching most of the online services involves placing only a local call; through elaborate *packet-switching* networks, these local calls are routed to the appropriate service's headquarters city with no long-distance charges.

### Speed Limits

Prodigy's screen is full of red, blue, and yellow patches. In each patch there's an enticing button to click: "Save 50% on skiwear!" "Be a Santa's Helper!" Why, this is just a bunch of buttons, I thought—just like HyperCard. All right, now: groceries ho!

It wasn't very difficult to find the grocery feature—there's a GROCERS button right on the welcome screen. But if you get lost, you can always call up a keyword index of Prodigy's 200 services and vendors; by double-clicking on any keyword, you go immediately to that offering's opening screen.

Well, *immediately* may not be the best word. Prodigy's graphics-intensive screens take a long time to redraw—and because only a sentence or two fits on a screen, you have to go through a lot of screens to get where

you're going. For example, that GROCERS button only took me to the "Welcome to Groceries" screen; from there, other buttons gradually led me to the actual ordering stage. By the time I arrived at the breakfast cereals screen, I'd plowed through nine screens, each taking an average of 26 seconds to appear. Elapsed time to reach Shredded Wheat: 4 minutes.

Although it took over an hour, I successfully ordered an armload of groceries. I did not, in fact, have to leave the house; the groceries were delivered by the participating store the next morning. (I paid an additional \$10 for the privilege.) The Information Age has its glitches, though—a few of the items I'd ordered didn't arrive, and I learned not to order anything that you'd want to select by eye (such as fresh meat or produce).

Later, I signed up for an electronic link to my bank (\$7 extra per month), which allows me to check my balances, transfer funds, and even pay my bills electronically—a tremendously convenient system. I discovered a Mac bulletin board (but I had to travel through six nested screens to get there). And I even learned to accept the advertisements on the bottom fifth of every Prodigy screen, since they're responsible for the service's low price (\$9.95 a month, no matter how much time you spend online).

But even though Prodigy is the service best positioned to reach a mass market, it's so slow that it's no fun to use. And there's not a trace of Macintosh about it. No windows, MultiFinder, menus, or fonts. Using Prodigy's great services with such a lousy program is like viewing great paintings through frosted glass.

## MONDAY

The glory of electronic networks is that most are available around the clock; I had to check the calendar to realize that a new business week had begun. And the service that fancies itself the most dedicated to business is Connect.

Connect has changed since its introduction, when the software you needed to reach it was called MacNet, and the service was a general-purpose Mac playground. The \$100 software has been given the much fancier moni-

ker Business Information Network, and the Connect service is being marketed as a communications hub for corporate clients. About 250 companies now have their own sections online (including about 30 Macintosh-related companies).

I had an article to turn in and a fax to send, and I thought I might as well check the latest mutual-fund prices. Upon connecting with Connect, I was giddily aware of the software's greatest blessing: it uses the Mac interface. There are menus, windows, and even folders.

All of Connect's offerings are organized into folders. Every company represented on Connect has its own folder, and there are plenty of folders designed to appeal to the individual: there's a Mac Symposium folder where you can find shareware programs to download, Macintosh bulletin board systems (BBSs), and Mac news. Wading through all these folders can quickly become a nuisance. But with the folder system you always know where you are and how to escape.

### A Businesslike Air

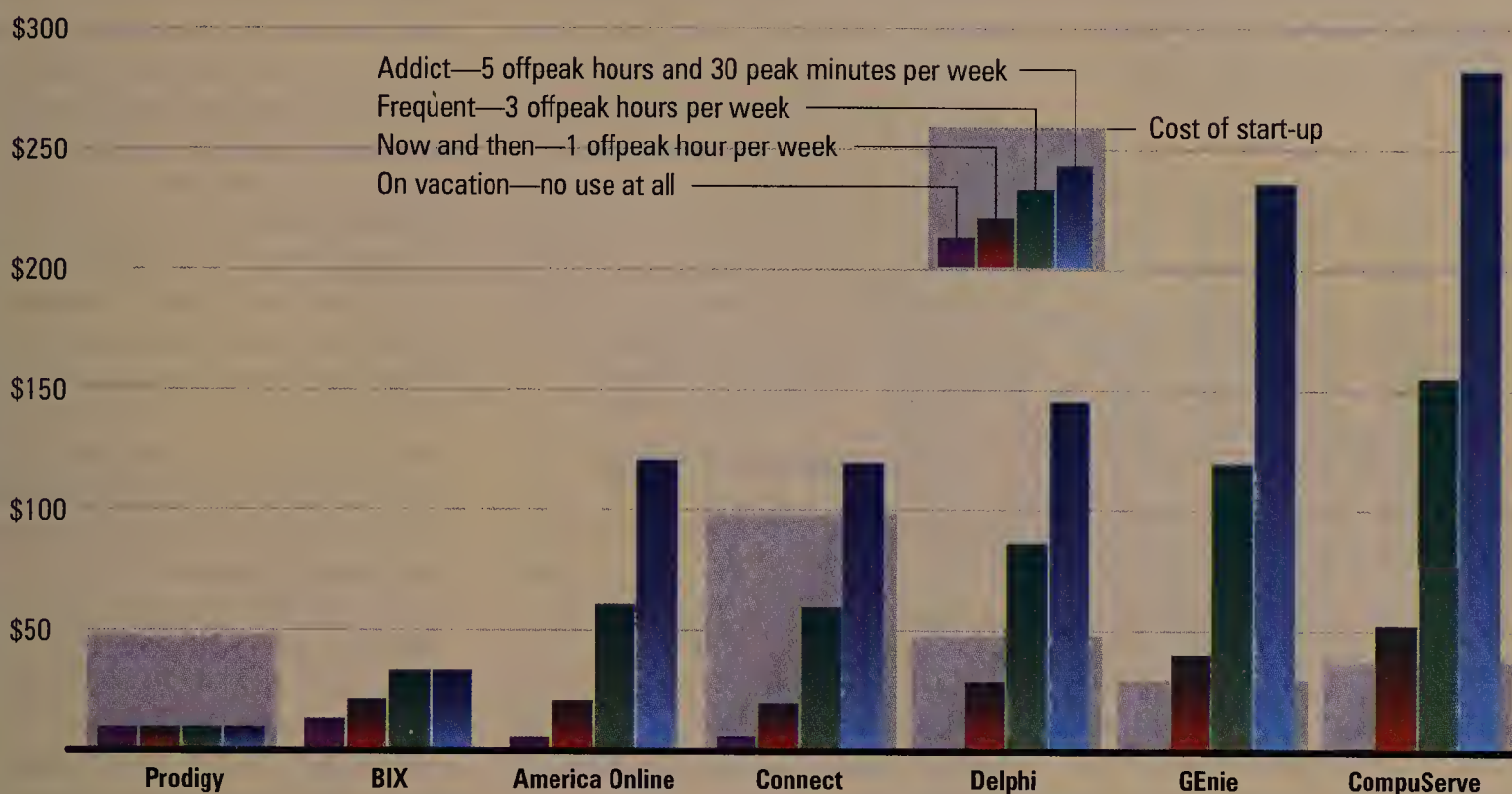
I hadn't spent much time with the Connect manual, but I didn't have to. To send electronic mail, I tried double-clicking on the prominently displayed pen-and-paper icon labeled Create. Sure enough, a text-processing screen appeared. I entered my message using normal Macintosh cut, copy, and paste methods (which I'll never again take for granted after using Prodigy and some other services). When I was finished addressing the memo, I clicked on the Send Now button, and my memo was on its way.

To send my fax message, I used the same text processor interface; as is usual for online fax services, faxes must be all text, no graphics. My fax went instantly to its recipient, and it only cost 80 cents. Not a bad expenditure for a guy who doesn't even own a fax machine.

When I logged on to Connect again later, however, things didn't go as smoothly. Three times the software half-connected with the service and then disconnected. No matter how hard I tried, I couldn't reach the service; I even tried an alternate access number. (I also learned that Connect,



# TABULATING THE TAB



It's a good thing you have a personal computer—you'll need it to figure out what you'll actually pay for these online services.

Every service's billing system is different. Most charge by the hour, but there are two rates: one for daytime use (usually 8 a.m. to 6 p.m.) and one for evening and weekend use. Some services include the cost of the packet-switching network (such as Tymnet or Telenet) in the hourly figures, and some don't. All of the sample figures listed here for Connect will be higher in practice because the service charges you 2 cents per kilocharacter (about 1K) at offpeak times (and 3 cents at peak times) when you

send or download files. And, as if all this weren't complicated enough, some of the services offer special discount plans to heavy users.

This table, then, is an attempt to show you real-world, grand-total charges for four typical users (including one who doesn't get online at all, so you can see which services charge a monthly minimum). These figures assume you're calling within the continental United States using a 2400-baud modem. Even these figures can't tell the whole story, though—don't forget to take the start-up costs into account, ranging from zero (America Online and BIX) to \$99.95 (Connect).

unlike most other services, shuts down for several hours every night.)

Over time, I began to recognize this inability to connect as a random but undisputable facet of Connect's personality—a character trait that's not particularly desirable in a business-oriented network. And finding out that unlike any other service Connect charges you extra for sending or receiving files (a few cents per kilobyte) dampened my enthusiasm a bit, too.

But then again, Connect doesn't have to appeal to a mass audience. Its stated goal is to form an electronic network for individual businesses; and for them, the cost of establishing a folder on Connect, surcharges and all,

may be less than the cost of setting up an in-house network.

## TUESDAY

I'm not sure I like Tuesdays. No sooner had I finished my Shredded Wheat and turned on the Mac than I was seized with panic: the computer was sick. It began to register double-clicks when I only clicked the mouse once. I'd try to drag an icon, only to launch it accidentally; menus dropped wildly down and up again; and when I clicked within a word, it became highlighted. Frantically I ran all my virus checkers; nothing. It was time to call in some greater brainpower. I called BIX.

The acronym stands for *Byte* (magazine) Information Exchange, and it has the reputation of being home to a lot of techies. But unlike Prodigy or Connect, BIX is a text-based system; it doesn't display icons, folders, or graphics. To call a text-based network, you have to buy a general-purpose telecommunications program, such as MicroPhone. Once online, you don't use a mouse; text-based systems respond only to typed commands. Finally, text-based services aren't Mac-specific; for better or for worse, you encounter sections dedicated to all manner of computers.

BIX is unique among text-based services in that you pay a flat yearly



fee for unlimited usage. This system—which BLX regulars love—causes one unfortunate side effect, however. At peak times, you may get an “all ports busy” message instead of a connection. And when you do reach the service, it may be frustratingly sluggish.

### BIX Fix

Despite its technical reputation, BIX isn't intimidating. A numbered list of possible commands appears at every juncture; you type the appropriate number and press Return. BIX offers the usual slew of services—E-mail, downloadable software, BBS areas—but I went straight to the Macintosh Questions area.

What I found there amazed me: hundreds of well-informed, articulate answers to all kinds of Macintosh questions that had been posted by BIX members. Examples: “Why is my new mouse's ball black instead of white?” (The black ones are the newer Taiwanese-made mice.) “Why do they say MultiFinder isn't true multi-tasking?” (It is much closer to multi-tasking than it's given credit for.) I added a question about my double-clicking dilemma to the pile, making

a mental note to check for responses the next day.

When I returned to BIX, I didn't find one answer to my question—I found many. The respondents all agreed that my double-clicking problem wasn't unusual and that the trouble lay with the contacts inside the mouse. One fellow even uploaded an illustrated 5-page set of instructions for repairing the mouse. I learned more about the clicking process than I'd ever wanted to know, but along the way, I found the solution to my problem and made a few friends.

## WEDNESDAY

The friends I was making online were telling me that Apple had released System 6.0.5. Fortunately, almost every online service is a treasure trove of publicly distributable Mac software. And no service (except Connect) charges you extra for downloading the software.

I tried GENie first. Like BIX, GENie is a text-based service, but it's much larger and has a less technical bent. There's a lot of creativity evident in GENie's upbeat, personal atmosphere.

There's an interactive game called Imagine Nation; the BBS areas are called roundtables; and there are plenty of useful services: the OAG airline ticketing system, a direct link to a discount stock brokerage, and several shopping systems. And GENie's menu system is friendlier than those of most text-based systems; each numbered menu offers Help and an exit to the previous menu.

Still, GENie is a complicated network. You only begin to appreciate it—or any text-based service—after spending several intense evenings online. During my first online session, I struggled in vain to figure out how to read just the messages I wanted to see. Only after ordering the manual and asking questions of people online—who were, as online users usually are, witty and willing to help—did I begin to tap GENie's vast potential. For instance, a novice has to plod, menu after menu, toward a particular service or BBS topic. The experienced GENie user, however, has learned that feature's *page number*, and can jump directly to that page. (And if you're really experienced, you'll uncover a feature no other text-based service offers: real-time games you can play against other users, during which your screen shows video game-style graphics instead of text.)

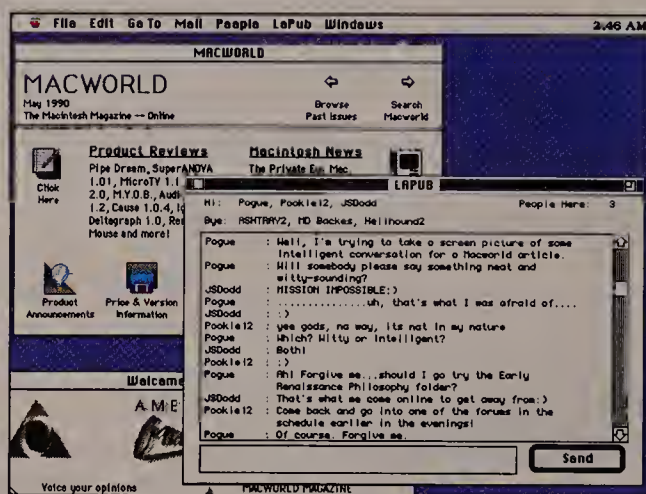
Whether because System 6.0.5 had not been posted on GENie yet or because I still hadn't figured out GENie's file-finding system, I could not locate System 6.0.5 in GENie's software libraries. So I rolled up my sleeves and decided to hook up with CompuServe, the granddaddy of the online networks.

## THURSDAY

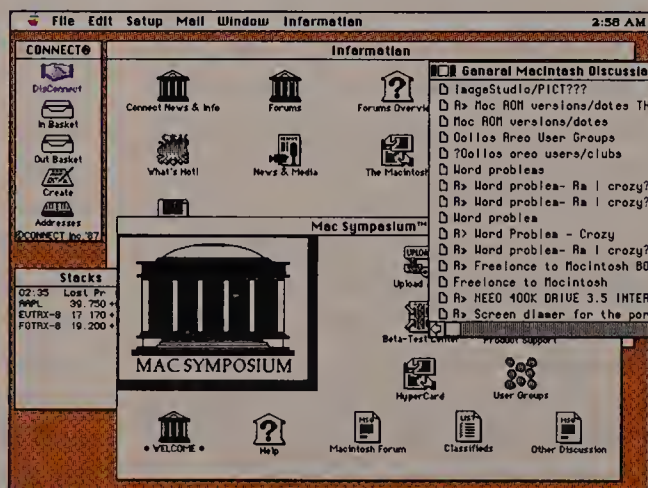
CompuServe is everything its reputation claims: vast, confusing, well established, well connected to other services, and expensive. With 14,000 features and services, it could easily be the subject of an article—even an encyclopedia—unto itself. And, like GENie, CompuServe is a text-based service with numerous menus and numerous shortcuts.

In my quest for System 6.0.5, I proceeded through several menus. First I chose Computers/Technology;

**Macworld Online** America Online offers you the chance to be in more than one place at a time. In the foreground, a meaningful discussion is taking place in real time; in the upper left, you can see the opening screen of Macworld's online edition.



**Connect Direct** The graphic interface of Connect is much simpler to navigate than that of text-based services. Here you can see the automatically updating stock ticker (lower left), the Mac Symposium opening screen, a list of BBS messages (the active window), Connect's main Information screen, and a control panel for disconnecting or sending E-mail.





sure enough, one of the choices on the next menu was Software Forums. I was certain I'd arrived. But after muddling around awhile, I discovered that to find Mac software, I'd have to go to a Hardware forum and from there to a Mac forum.

One of the choices in the Mac forum, File Finder, sounded good to me. I told it to search for System 6.0.5. After a moment, CompuServe told me, "No files located." But when I searched for System, CompuServe found 234 files. I tried to narrow the search by date (only files posted within the last month), but this time CompuServe told me, "No files located." After a few more fruitless searches, I gave up.

By now I was lost. In fact, I could find no way to escape the File Finder, and the CompuServe meter was running. I typed HELP, and the ensuing screenful of information told me that I could return to the main menu by typing TOP. To make a much longer story short, I spent over an hour meandering around the CompuServe universe before I found System 6.0.5 in a forum called Macdev.





### Help on the Way

That not-so-unusual anecdote demonstrates that CompuServe simply isn't an informational cafeteria, where you can see what you want and take it. It's a maze of dungeons, each stocked with treasure, but impossible to navigate with no map and no experience.

If you decide to undertake the quest, buy *How to Get the Most out of CompuServe* (Bantam Books, 1989) from CompuServe. Working through this book is a project in itself, but the well-explained navigational tips could save you plenty of time (that is, money) online. You might also try a program called Navigator 3.0 that automates getting mail, messages, and files from CompuServe, saving you plenty of money and expensive meandering. Navigator won't, however, let you make plane reservations, shop, chat with other users, do research, or—most important of all—explore.

CompuServe's administrators are working to address some of the system's problems. They hope to soon finish the Information Manager, a graphic interface that's designed to make the service less daunting for Mac

# IRRITATION INDEX

 Absolutely no sweat  
 Could use some improvement  
 Can really irritate sometimes  
 Oy, forget it

	America Online	BIX	CompuServe	Connect	Delphi	GENie	Prodigy
Navigating							
Getting and staying connected							
Calculating the costs							
Finding and downloading files							NA
Using the interface							

Just how much fear of telecommunications is justified? Some, certainly; the text-based services in particular weren't created with intuitiveness as a design goal.

This purely subjective table helps pinpoint the strengths and weaknesses of each system. It's been created with Mac users new to telecommunicating in mind; experienced CompuServe users, for example, have no problem at all navigating.

users. CompuServe is currently the most complete, most well-stocked service in the country, but it's also the most intimidating. Therefore, if this new interface lives up to its previews by making all that information easier to access, it will make CompuServe exceptionally useful. You'll still pay through the nose, but—in theory at least—you'll spend less time online.

## FRIDAY

It's almost a personal-computing cliché by now: I can make plane reservations right on my computer! Long intrigued by the specifics—and bored silly after a week in my apartment—I decided that it was time to escape. I began planning a trip to the West Coast.

Most of the services provide gateways to one of the three major airline-ticketing systems: the Online Airlines Guide, American Airline's Eeasy Sabre,

or the PARS Travel network. Delphi offers all three.

### The Oracle

Of all the text-based services, Delphi is the most natural to use. Menus always offer you the chance to back-track or to read context-appropriate help. And menu commands aren't numbered, as they are on other services; you just type the first few letters of the command you want. This system involves more typing on your part—but using plain English to move around is surprisingly comforting. Then, too, when Delphi wants you to enter a command, it doesn't simply draw a symbol (like the exclamation mark [!] on CompuServe or the greater-than sign [>] on GENie); it asks. For example, it might say, "What would you like to do?"

Even without the Delphi manual—a model of clarity—I was able to find

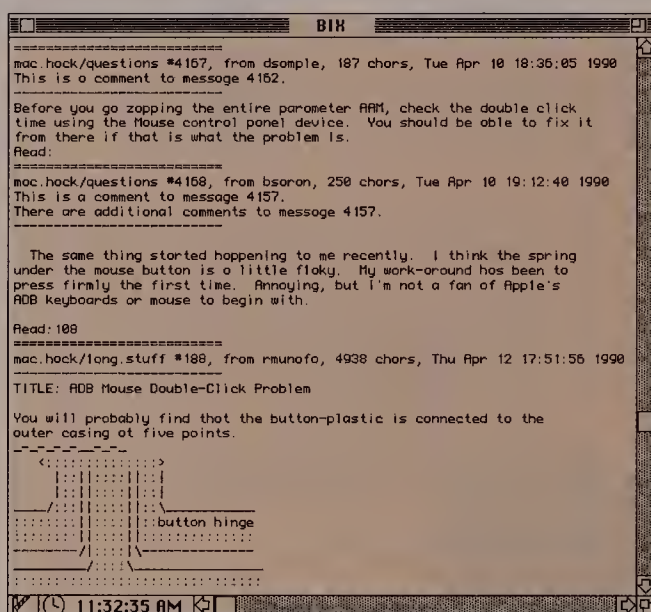


all three of the airline reservation systems; at the main menu, I simply typed Travel. The two free airline services—PARS and Eeasy Sabre—show you what flights are available between any two cities on a given day. And you can also find out what the lowest fare is for a particular route. Unfortunately, it's next to impossible to relate these two pieces of information—the schedule display doesn't show the fares, and the fare display doesn't show the schedule. That may be one reason the much superior OAG system carries a surcharge on all of the online networks. In any case, I eventually tracked down, and booked, a flight from New York to Los Angeles. The fare restrictions were clearly indicated on the screen, and a (human) travel agent

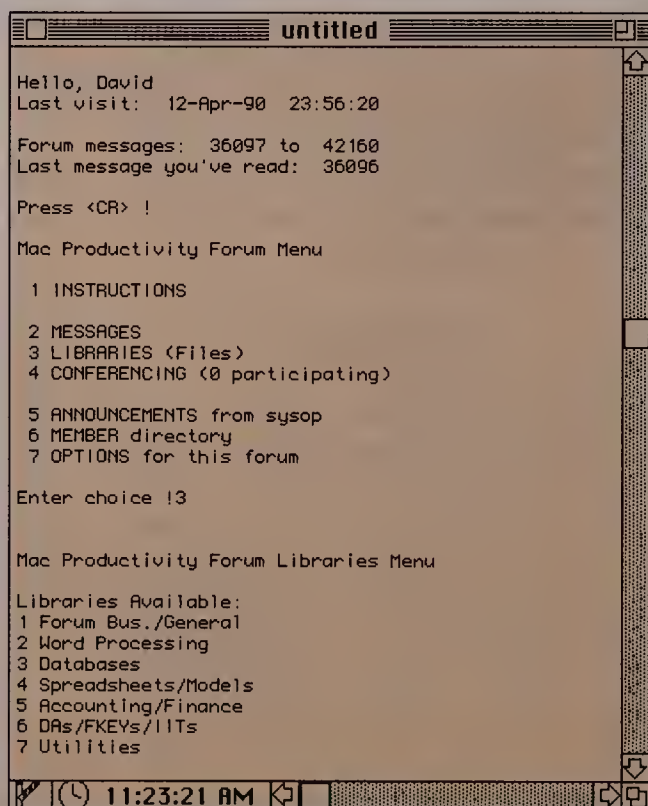
later confirmed that I had secured the lowest fare available.

I became steadily more impressed with Delphi; a terrific introductory guided tour makes the service even easier to understand. Whereas CompuServe can seem hostile, and even GENie seems a little alien, Delphi just feels honest. No doors are locked or hidden away. Even though the text that scrolls up the screen is the same old 9-point Monaco, it's cleaner and less cluttered on Delphi than on other text-based services. There isn't as large a Macintosh presence as there is on some other networks, but the general-purpose services (fax; E-mail; shopping; games; news, weather, and sports; movie reviews; real-time chatting) are first-rate.

**BIX Replies** The BBS messages on BIX are separated by dotted lines; in this illustration, you can see several replies to a technical question about the mouse. BIX also offers a powerful Search command that lets you search the entire BIX network for a particular keyword.



**CompuServe Text** The quintessential text-based service: CompuServe. You see a numbered list of choices; at each exclamation-point prompt, you type the number of the choice you want. Since most menus don't let you escape to the previous menu it's possible to get good and lost on CompuServe. It's also possible to learn the secret command to backtrack—but you'll have to do some reading to find out.



## SATURDAY

In my modem-happy, ruthless quest for electronic productivity, I realized that I'd overlooked one small aspect of life. I had faxed my faxes, mailed my mail, and booked my flights electronically, but I hadn't really had fun—something not generally high on an online service's priority list.

Any, that is, except America Online. This Macintosh-and-Apple II-exclusive service was the perfect end-of-the-week break. There's not a single command to learn, not a page of manual to read, and not one navigational reason to keep a pencil and paper by your side. Like Connect, the America Online software provides an elegant graphic interface, complete with icons and windows. Instead of shoving the Macintosh interface to one side, as the text-based and Prodigy-type services do, America Online embraces it.

### Attractive Interactive

Because America Online's most prominent attribute is its interactivity, you feel like you're walking through a room filled with people instead of mainframes; you see what people type (in any of the interactive "rooms"), and they see what you type. As with the chat features of other networks, it's liberating to attend a party without so much as combing your hair; but unlike those of other networks, America Online's chat service is intuitive, easy to use, and extremely responsive.

During one discussion—about the woes of city living, as I recall—I ducked into the generously stocked Mac software folders. Downloading a program is as simple as double-clicking on its icon to see a description and then clicking on the Download button.

Call them trivial pursuits, but I also had fun playing America Online's interactive games: word games, trivia quizzes, and even song-lyric tournaments. (Winners get free time online.) It's not actually the games, but rather the wisecracking banter that takes place during each round that makes these events so enjoyable. As a matter of fact, during one game I met a Los Angeles urban planner who, when I eventually arrived in L.A. on my electronically booked flight,



## ONLINE FEATURES COMPARED

	America Online	BIX	CompuServe	Connect	Delphi	GEie	Prodigy
<b>VITAL STATS</b>							
Voice phone	800/227-6364	800/227-2983	800/848-8199	800/456-0553	800/544-4005	800/638-9636	800/776-3449
Access network	○	Tymnet	proprietary	Tymnet, Acunet	Tymnet, Telenet	proprietary	proprietary <sup>1</sup>
Start-up cost/monthly minimum	free/\$5.95	free/\$13.33	\$39.95/\$1.50	\$99.95/\$6	\$49.95 <sup>2</sup> /none	\$29.95/none	\$49.95/\$9.95
Price per hour (peak/off-peak)	\$10/\$5	\$6/\$2 <sup>3</sup>	\$12.80/\$12.80	\$10/\$5	\$17.40/\$7.20 <sup>4</sup>	\$18/\$10	free/free
Interface	graphic	text-based	text-based	graphic	text-based	text-based	graphic
Proprietary software?	●	○	○	●	○	○	●
<b>FEATURES</b>							
E-mail/file transfer	●/●	●/●	●/●	●/● <sup>5</sup>	●/○	●/●	●/○
Stock brokerage	○	○	●	○	○	●	●
Stock Quotes	●	○	●	●	●	●	●
Shopping	●	○	●	○	●	●	●
Airline reservations	●	○	●	○	●	●	●
Banking	○	○	○	○	○	○	● <sup>4</sup>
Conferencing (chat)	●	●	●	○	●	●	○
Real-time seminars	●	●	●	○	●	●	○
Mac software downloads	●	●	●	● <sup>5</sup>	●	●	○
Fax (cost)	\$1	○	\$0.75	\$0.80	\$1.25	○	○
U.S. mail (cost)	\$2	○	\$1.50	\$2	○	\$1	○
Games	●	●	●	○	●	●	●
Mac BBSs	●	●	●	●	●	●	●
Encyclopedia	●	○	●	○	●	●	○
Movie reviews	●	○	●	○	●	●	●
News/weather	●/●	●/○	●/●	●/● <sup>5</sup>	●/●	●/●	●/●
Senior Net	○	○	○	○	●	○	○
Mac companies online	○	30	●	30	0	50	5
Estimated number of members	50,000	35,000	555,000	17,000	100,000	195,000	400,000

<sup>1</sup> Prodigy not available in all areas. <sup>2</sup> Includes two nonprime hours. <sup>3</sup> These charges are for Telenet. <sup>4</sup> \$160 yearly plus Tymnet charges. A flat-fee Tymnet program is available for \$20 per month. <sup>5</sup> Extra cost. ● = yes ○ = no

gave me an architectural tour of the city. In person.

### On the Line

The interface success of services like America Online and Connect clearly demonstrates how far the text-based services have to go before they are universally appealing; and the useful services offered by Prodigy and CompuServe illustrate how practical these networks may one day become.

But during my one sedentary—but stimulating—week online, I couldn't help but feel that the current networks are only in their infancy. "Why, when I was your age," I'll tell my kids, "I had to *click on icons* to move from forum to forum!" Calls are still prone to disconnection or static on the line; most text-based services are still frustrating to navigate; and there's still too much redundancy—I must have filled in my name an address five times on each service.

And I was amazed at the information I couldn't find online: TV listings; nationwide electronic banking; a dictionary; a zip-code finder; and an atlas. (When I needed to look up a city in Colorado one night, the only network that helped me was America Online. I walked into a roomful of people talking and said, "Hey! Anyone have an atlas?" Someone did.) And, of course, the information that *is* available is often hard—and expensive—to find.

### Down the Line

But already the reasons to fear telecommunicating are fading. The graphic-interface services are so easy to use that you'll be productive the first time you go online; any Mac user who hasn't visited America Online is missing out on a great thing. Of the text-based services, nothing really compares with CompuServe for sheer informational majesty; despite its despised complexity and even less loved

pricing, it's a tremendous resource. GEie has much in common with CompuServe, but is less prestigious, less intimidating, and less expensive. Or, for an even friendlier text-based experience, try Delphi.

As I burst out of the apartment on Saturday night, I was amazed at how much I'd accomplished. Business, amusement, and even a sort of surrogate social life are available electronically. Surely someday these great efficiency enhancers will be part of everyone's everyday life. For the moment, however, it felt good to step back into the real world. ■

See *Where to Buy* for contact information.

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# PRIME

## A GUIDE TO VIDEO HARDWARE FOR THE MAC

by *Peter S. Marx and Franklin N. Tessler* ~ Amid the hype

surrounding the promotion of desktop video and multimedia as the technical revolution of the 1990s, it's easy to forget that video applications are nearly as old as the Macintosh itself. Back in 1984, when Apple's most powerful CPU came with just 128K of memory, you could buy a *digitizer* to capture pictures from a video camera and display the *dithered* images on the Mac's 9-inch screen. (For a glossary of the italicized video terms, as well as some other terms commonly used in video, see "A Video Dictionary.") ~ Development of higher-end video applications had to wait until the introduction of the Mac II in 1987. With their expanded memory, larger monitors, slots, and color, the Macintosh II and its successors are valued tools in the

# TIME

workshops of video amateurs and professionals alike. (For an extensive report on Mac applications in film and video, see "Star Quality," June 1989.) ~ The Macintosh wasn't designed to work with the video signal used by television or professional broadcasting equipment, and you won't be able to accomplish much video production with even the fastest Macintosh by itself (see "Mac versus NTSC"). Fortunately, as in other areas, third-party developers have jumped in to fill the gap. Video add-on hardware is one of the fastest-growing segments of the Mac marketplace, and new products are introduced almost daily (see "Mac TV Tools," September 1989). ~ In this article, we'll try to bring some order to the confusing array of video products for the Macintosh. Few individuals have the financial means of a professional TV-studio director, so we'll focus on Macintosh equipment suitable for three budget levels—

# VIDEO



Wade Sisler, a television and motion-picture specialist at NASA's Ames Research Center in Moffett Field, California, takes advantage of the Mac to bridge the gap between still images and video.





low-end, midrange, and stratosphere. If you're new to video, we suggest you begin by turning to Jim Heid's primer, "Getting Started with Desktop Video," in this issue.

### Budget Video

For less than \$1000, digitizers such as Koala Technologies' MacVision or Digital Vision's ComputerEyes let you import images from a video camera or VCR, and display or save them on the Mac. (Before you reach for that Indiana Jones tape, remember that the material on most videotapes is protected by copyright. The FBI warning tacked onto movie videos applies to any method of copying.) If you're working with a Macintosh Plus or SE, you'll only be able to view the images in dithered black and white, although the files you save retain up to 256 gray levels. While neither product captures color images, both work with color video sources. If you absolutely need color and have a Mac II at your disposal, but your budget is limited, you can digitize color images with ComputerEyes Professional for less than \$500 (see "Video-Product Roundup"). A major limitation at this level is the amount of time required to capture an image—all three products just mentioned require at least six seconds to process an image. Consequently, if you're working with moving subjects, a digitizer probably won't do the trick.

Images taken from video often require touching up before they're ready to print. Although the software that comes with video-capture hardware is sufficient for minor editing tasks, such as cropping and adjusting contrast, a dedicated image processing application lets you do much more. For example, the selecting, blending, and filtering tools found in image-editing programs can help compensate for poor lighting or composition of the original scene. Unfortunately, editing dithered images on a Macintosh Plus or SE isn't easy. A Macintosh II makes life much simpler by show-

ing you the captured image in true gray-scale or color.

Many late-model camcorders have character generators that let you superimpose multicolored titles on a video recording. That may be fine for family vacations, but what if you need to export Macintosh graphics to a videotape for training or sales? A new product from Mass Microsystems called the ColorSpace Plus/SE lets Macintosh Plus and SE users mix Mac graphics with any NTSC or S-Video source. While its \$1895 cost isn't exactly low-end, the ColorSpace Plus/SE brings video *overlay* capabilities to compact Macintoshes for the first time

video output: the TV Board (\$599), an 8-bit NTSC/PAL NuBus video board that will display 256 colors in the form of a standard composite video signal; and the TV Box (\$399), an external device that outputs 24 bits per pixel when used in conjunction with 24-bit color boards.

### A Step Up

Most of the video hardware available for the Mac falls into the middle range. Although more expensive than digitizers, the products in this category fall within the price range of many budgets; many school media labs can afford these, especially when educational discounts are applied. Let's see what the extra money buys.

As we've said, digitizers usually take several seconds to capture video images, which makes digitizers useless for working with moving subjects. *Frame grabbers* like Advent Computer Products' Neotech Image Grabber, Data Translation's Quick-Capture (for black and white) and ColorCapture (for color), RasterOps' FrameGrabber 324NC, and Personal Vision from Orange Micro all do their work within the  $\frac{1}{30}$  second allotted to each video *frame*, allowing you to work in real time. At press time, Mass Microsystems announced QuickImage 24 (\$995), a NuBus board that captures NTSC or PAL video from any composite or S-

Video source in real-time 24-bit color.

As long as your subject is moving slowly enough to appear sharp in individual frames, a frame grabber will do the job. (The ColorSnap-32 from Computer Friends takes  $\frac{1}{5}$  second to digitize each frame, fast enough for many applications.)

The frame grabbers listed in "Video-Product Roundup" all come with software that lets you preview live video in a window on the Mac screen and capture and store individual images on disk. Products in this category are all NuBus boards, so they're only compatible with the Mac II. While extra RAM and a large hard disk are desirable



JONATHAN LEVINE

ALAN MILLER, VICE PRESIDENT IN CHARGE OF POSTPRODUCTION FOR REBO STUDIO IN NEW YORK CITY, BELIEVES THE MAC-BASED AVID SYSTEM HELPS TO INSURE REBO'S PLACE AS A PIONEER IN THE FIELD OF HIGH-DEFINITION VIDEO PRODUCTION.

at any price. Housed in a separate box, the ColorSpace Plus/SE attaches to the Mac's SCSI port. (The unit also requires a dealer-installed Video Adapter Assembly, also from Mass Microsystems, that goes inside the Macintosh case and costs an additional \$100.)

The ColorSpace Plus/SE lets you assign up to three colors to a Mac graphic and you can mix the graphic with a standard video signal for recording, or viewing on a video monitor. HyperCard-based titling software included with the package also makes it easy to superimpose text on a scene.

At press time, Generation X announced two lower-cost products for



for working with dithered images on a Mac Plus, they're essential for working with a frame grabber. Plan on at least 4 megabytes of RAM, especially if you're using MultiFinder. Also, even the best frame grabbers and image-editing applications go only so far in compensating for a poor video signal, so be sure that your camera or other video source is the best available. If you're working with prerecorded material, try to use a laserdisc rather than videotape, and use sufficient lighting when shooting live scenes.

Surprising as it may seem, the one feature missing from all of the frame grabbers mentioned so far is the ability to display images on the Macintosh monitor. They're all capable of converting an analog video signal into the digital format used by the Mac, but they rely on a separate video board to drive the Macintosh screen. While an extra NuBus board or two might not be an issue in a six-slot Macintosh II, IIfx, or IIfx, board space is at a premium in the compact IICx and IICi models. Until recently, combining video display and frame grabbing on one board came at a high price. But just as Mass Microsystems' ColorSpace Plus/SE broke the price barrier for video overlay on the Mac Plus and SE, the ColorBoard 364 from RasterOps set a new standard for low-cost video display and image capture on the Macintosh II.

The ColorBoard 364 combines 24-bit color display and color frame-grabbing functions on one \$1995 NuBus board. The board is compatible with any NTSC or S-Video input signal, and it can drive an Apple 13-inch or compatible monitor. An optional tuner module, which connects to an Apple Desktop Bus (ADB) port, lets you tune to standard television broadcasts, from cable or an antenna. Aapps Corporation's DigiVideo is another NuBus board that provides live television in a Macintosh window. With a few mouse clicks, you can set the volume, change channels (yes, it's cable-ready), and adjust brightness and contrast. DigiVideo also works in the background under MultiFinder. While we doubt that anyone would choose to replace a television set with DigiVideo, the product does offer an intriguing glimpse into the future of television.

### Video In and Out

Another Mass Microsystems product, the ColorSpace Ili, lets Macintosh II users overlay graphics on a video signal. In contrast to the three-color limit of the ColorSpace Plus/SE, the ColorSpace Ili can incorporate up to 256 different colors at once, making it suitable for many professional video applications. The board is compatible with either *composite* or *RGB* video input. The ColorSpace Ili can capture images, but digitizing a single frame takes 20 seconds. The ColorSpace Ili can't function as a Macintosh display board, since it can only drive composite video monitors.

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## IF YOU'RE INTENT ON WORKING WITH BROADCAST- QUALITY VIDEO, YOU'LL HAVE TO INVEST IN EQUIPMENT COSTING AT LEAST AS MUCH AS THE MACINTOSH ITSELF

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Mass Microsystems offers another board called the ColorSpace FX, which works in tandem with the ColorSpace Ili to produce live video on an Apple-Color monitor. Using a bit of electronic wizardry, the two boards act together to combine a standard video signal with Macintosh graphics into one compatible with the Apple monitor. The ColorSpace FX also lets you add a number of special effects to a video sequence, including pan, zoom, shrink, mirror, and spin. Unlike the ColorSpace Ili, the Ili-FX combination can perform true 24-bit frame grabbing in  $\frac{1}{30}$  second.

Workstation Technologies' Moonraker is another board that can display live video on the Macintosh screen. Moonraker can handle two video signals at once, making it suit-

able for video presentations that take advantage of multiple sources. Frames digitized in real time are recorded directly into memory, so the board can digitize an uninterrupted video sequence. (The number of frames that can be digitized depends on how much memory is installed in the Macintosh.) Without another board, the Moonraker doesn't let you overlay video with graphics.

If you simply need to output Macintosh-generated graphics to video, and you don't require overlay or image capture, you can save money by purchasing an *encoder/decoder*. In contrast to video-overlay boards like the ColorSpace Ili, encoder/decoders are usually separate devices that convert video from one format to another. For example, the VIDI/O Box from Truevision can take an RGB signal from a Macintosh display board and convert it to NTSC video for recording. The VIDI/O Box also provides S-Video input and output. All of these devices can be as inexpensive as Computer Video's Video NTSC Encoder or as expensive as RGB Spectrum's \$9995 RGB/Videolink 600A. In addition to converting Macintosh RGB output to composite or RGB video, the RGB/Videolink 600A includes a filter to remove *flicker* from the video display, corrects for differences in *aspect ratio*, and adds color-bar generation for adjusting monitors.

### Into the High End

If you're intent on working with broadcast-quality video, or if you need to coordinate multiple video and audio inputs, you'll have to invest in equipment costing at least as much as the Macintosh itself. When people think of high-end video, they usually have professional or broadcast applications in mind.

If you've ever watched the nightly news, you've seen a video image overlaid with multicolored graphics. The Mac is ideal for creating video overlays for broadcast because the Mac supports a wide range of software products and fonts, and it is wonderfully easy to use. Higher-end, relatively expensive products such as the NuVista board from Truevision incorporate 24-bit color display, frame grabbing, and overlay functions on a single board.



## VIDEO-PRODUCT ROUNDUP

	Company	List Price	Minimum Configuration	Inputs <sup>1</sup>	Outputs <sup>1</sup>	Mac Interface	Number of Bits	Image Capture	Display	Video Overlay	Software
<b>DIGITIZERS</b>											
ComputerEyes	Digital Vision	\$249.95	512KE	A		Serial	8	●	○	○	○
ComputerEyes Professional	Digital Vision	\$449.95	Macintosh II	A, B		NuBus	24	●	○	○	●
MacVision	Koala Technologies	\$499.95	Plus	A		Serial	8	●	○	○	●
<b>FRAME GRABBERS</b>											
ColorCapture	Data Translation	\$2995	Macintosh II	A	A, C, D	NuBus	24	●	○	●	●
ColorSnap-32	Computer Friends	\$995	Macintosh II	A		NuBus	24	●	○	○	●
FrameGrabber 324NC	RasterOps Corporation	\$1495	Macintosh II	A		NuBus	24	●	○	○	●
Neotech Image Grabber	Advent Computer Products	\$1499 <sup>2</sup>	Macintosh II	A, B		NuBus	8	●	○	○	●
Moonraker	Workstation Technologies	\$2995	Macintosh II	A, B, C		NuBus	24	●	○	○	●
NuVision	Perceptics Corporation	\$26,395	Macintosh II	E		NuBus	24	●	●	○	●
NuVista	Truevision	<sup>3</sup>	Macintosh II	C	C	NuBus	24	●	●	●	●
Personal Vision <sup>4</sup>	Orange Micro	\$1499	Macintosh II	A, C		NuBus	24	●	○	○	●
QuickCapture <sup>5</sup>	Data Translation	\$1295	Macintosh II	A, C, D		NuBus	8	●	○	○	●
Scion Image Capture Board	Scion Image Systems	<sup>6</sup>	Macintosh II	A, B, C		NuBus	24	●	○	○	●
ColorBoard 364	RasterOps Corporation	\$1995	Macintosh II	A, B	C	NuBus	24	●	●	optional	●
VideoDesk 1/24 <sup>7</sup>	Computer Sciences Corporation	\$5795	Macintosh II	A, C, D	C	NuBus	24	●	●	○	●
<b>VIDEO OVERLAY</b>											
ColorSpace Ili	Mass Microsystems	\$2299 <sup>8</sup>	Macintosh II	A, C	A	NuBus	24	●	○	●	●
ColorSpace Plus/SE	Mass Microsystems	\$1895	Plus or SE only	B, F	A, B	SCSI		○	○	●	●
Genlock Converter	Specialized Computer Systems	\$995	Macintosh II					○	○	○	○
SFX Option Board <sup>9</sup>	RasterOps Corporation	\$1495	Macintosh II	A, B	A, B, C	NuBus	8	○	○	●	●
TV Producer Pro <sup>10</sup>	Computer Friends	\$1099	Macintosh II	A	A	Apple Video Card	8	○	○	●	○
TV Producer RGB <sup>10</sup>	Computer Friends	\$1599	Macintosh II	A	A, C	Apple Video Card	8	○	○	●	○
<b>VIDEO OUTPUT</b>											
Macintosh Display Card 4•8	Apple Computer	\$648	Macintosh II		C, G	NuBus	8	○	●	○	○
Macintosh Display Card 8•24	Apple Computer	\$899	Macintosh II		C, G	NuBus	24	○	●	○	○
Macintosh Display Card 8•24GC <sup>11</sup>	Apple Computer	\$1999	Macintosh II		C, G	NuBus	24	○	●	○	○
ColorBoard 208	RasterOps Corporation	\$495	Macintosh II		A, C, G	NuBus	8	○	●	○	○
ColorBoard 264	RasterOps Corporation	\$745	Macintosh II		A, C, G	NuBus	24	○	●	○	○
DigiVideo	Aaps	\$595	Macintosh II	A, F		NuBus	8	○	●	○	○
DisplayServer SE-TV Option <sup>12</sup>	Lapis Technologies	\$528	SE only		A	Installs in SE		○	●	○	●
<b>ENCODERS/DECODERS</b>											
DT2879-60HZ	Data Translation	\$1495	NA	A, C	A, C	NA	NA	○	○	○	○
NTSC Converter	Specialized Computer	\$599	NA			NA	NA	○	○	○	○
Video NTSC Encoder	Computer Video	\$395	NA	C	A	NA	NA	○	○	○	○
RGB/Videolink 600A	RGB Spectrum	\$9995	NA			NA	NA	○	○	○	○
VIDI/O Box	Truevision	\$995 <sup>12</sup>	NA	A, B, C	A, B, C	NA	NA	○	○	○	○

● = yes, ○ = no

Notes: <sup>1</sup> A = Composite, B = S-Video, C = RGB, D = RS-170, E = RS-343, F = NTSC, G = NTSC RGB. <sup>2</sup> \$499 for 24-bit Color Adaptor Module.<sup>3</sup> 1-bit \$2995; 2-bit \$4495; 4-bit \$6495. <sup>4</sup> Requires Converter Module to digitize color from NTSC. <sup>5</sup> Digitizes RGB color in under one second with supplied ColorKit software.<sup>6</sup> VideoImage 1000 Classic \$1095; VideoImage 1200 Professional \$1295; VideoImage 1500 Classic Plus \$1495; VideoImage 2000 Media Master \$1995.<sup>7</sup> Two NuBus boards. <sup>8</sup> With ColorSpace FX \$3495. <sup>9</sup> Requires RasterOps ColorBoard 224, 724, or 232 for display. <sup>10</sup> Attaches to Apple Video Card.<sup>11</sup> Includes graphics acceleration. <sup>12</sup> Produces noninterlaced video and needs converter for mixing with NTSC signals.



The NuVista comes in 1MB, 2MB, and 4MB versions; features *genlock*; and lets you program output resolution to ensure compatibility with a variety of monitors. In addition to the standard red, green, and blue channels, the 2MB and 4MB boards also incorporate a fourth channel, called the alpha channel. This 8-bit channel can be used to create special effects, and it's required for working with some types of studio video equipment.

The NuVista+ board should be on the shelves by the time you read this. In addition to the features above, the NuVista+ will include enhanced blending features; chroma keying abilities; and wipe and fade effects. The best news is that the board eliminates the need for a separate VIDI/O box.

Another new player, RadiusTV, was announced as we were going to press. RadiusTV—a video processing engine, external audio/video input processor, and television tuner—will display and digitize live 16-bit video images in real-time in a resizable window of up to 640 by 480 pixels. It works with 24-bit color adapter boards that support the high-speed block-transfer mode of the NuBus. A software desk accessory shipped with the product allows the user to access RadiusTV from within a running application. Another software program included in the package allows special effects and limited image processing.

### Keeping in Control

The Mac can control postproduction video equipment too. For example, *SMPTE Time-Coding* is incorporated into products from Interactive Media Technologies and Specialized Computer Systems for controlling  $\frac{3}{4}$ -inch VCRs, high-end  $\frac{1}{2}$ -inch VCRs, and multitrack audio systems. Interactive Media Technologies' IMTX 8000, first introduced at the April 1990 Macworld Expo, is capable of controlling up to 12 video and 20 audio sources for dubbing, mixing, and display. The familiar user interface is based on SuperCard from Silicon Beach. Although the device costs a minimum of \$7000, it represents a price breakthrough in an industry where \$100,000 workstations are commonplace. Edit Worx, from Specialized Computer Systems, provides a similar function, permitting

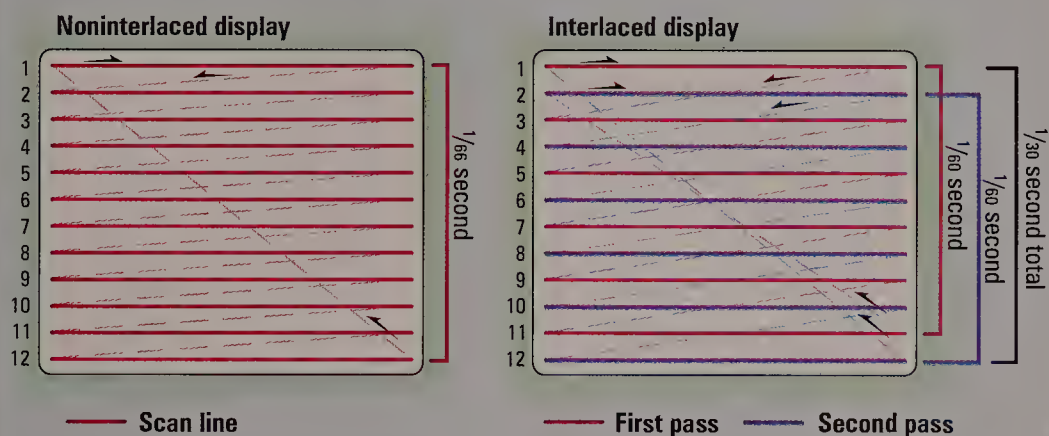
editors to assemble video sequences from multiple time-coded sources.

### Measuring, Analyzing, and Dissecting

The Macintosh, as many researchers have discovered, is an excellent tool for scientific research. Video is now widely used in many areas of scientific research, including medicine. Extremely sensitive video cameras are often mounted on microscopes used to study blood and tissue samples. Perceptics Corporation's NuVision boards—the Pixel Grabber, Pixel Pipeline, and Mega Grabber—can extract

software is how to cope with the enormous quantity of data that their products generate. At about 1MB per 24-bit frame, even a few seconds of digitized video can consume hundreds of megabytes of disk space. Equally challenging is the problem of transmitting these vast amounts of digital information rapidly and cheaply. For years, Macintosh users have been able to reduce transmission costs and storage requirements by using file-compression utilities like Raymond Lau's popular application StuffIt (now available from Aladdin Systems). But while

## MAC VERSUS NTSC



Macintosh displays are scanned in a single pass of the CRT's electron beam, starting at the top left and proceeding to the bottom right. For the Apple Video Card, the entire process takes  $\frac{1}{60}$  second, with each scan line corresponding to a row of pixels.

NTSC television displays are scanned at a slower rate in two separate passes, one for the odd-numbered scan lines followed by one for the even-numbered lines. A complete frame consists of 512 lines, but due to overscanning not all lines appear on the screen. Since the NTSC standard doesn't allow for sufficiently rapid modulation of the signal, computer-generated graphics do not appear as clear on a television monitor as they do on a Mac-compatible monitor.

information from raw images and perform mathematical transformations on them in real time. The Mega Grabber, for example, can digitize 1320 by 1035 *pixels* from ultrahigh-quality slow-scan television images. Of course, systems with these capabilities often cost more than \$25,000.

### Putting the Squeeze On

One of the greatest challenges facing developers of video hardware and

programs like StuffIt might achieve a 60 percent savings, the science of image compression promises far greater dividends.

To illustrate how image compression works, let's consider the unlikely case of a 1000-by-1000-by-1-bit image with one black pixel in the top left corner. In its raw form, the image file would occupy 1 million bits, or 122K. But the vast majority (99.9999 percent) of the image is white space. We could



# A VIDEO DICTIONARY

**Aspect ratio** The ratio of the horizontal size to the vertical size of a picture. In television, the aspect ratio is 4:3.

**Cathode ray tube (CRT)** Output device in which a stream of electrons draws an image on a screen coated with phosphor dots, which glow when struck by the electron beam.

**Composite video** A standard video signal in which the red, green, and blue components are combined with a timing (synchronization, or *sync*) signal.

**Decoder** A device used to convert a composite video signal into red, green, blue, and sync components.

**Digitizer** A device used to convert video signals into a digital format suitable for display on a computer screen. Digitizers typically take several seconds to convert an image, and therefore require that the video picture be perfectly still.

**Dither** A technique for simulating more colors or shades of gray than are actually available in the current output device. For example, a black-and-white-only display like the Macintosh SE's, does a fair job of approximating a gray-scale picture by using patterns of black dots and white dots.

**Encoder** A device that converts an RGB video signal into a composite video signal.

**Flicker** The flashing effect seen at zones of abrupt change in color or brightness in a CRT display. The term also refers to the strobe effect that occurs when the refresh rate of a video display is low enough for the eye to perceive. Monitors plagued by flicker tend to cause fatigue and eyestrain.

**Field** The even- or odd-numbered scan lines that constitute one-half of a television picture.

**Frame** The complete television picture, consisting of two interlaced fields (see *interlaced video*).

**Frame grabber** A device that digitizes video at real-time rates, usually more costly than a digitizer.

**Genlock** A technique for mixing two or more video signals and ensuring that they remain in step. Combining video signals without genlock results in distortion.

**Interlaced video** The process by which two separate video fields form a television picture. In the NTSC format, the field consisting of the odd-numbered lines is drawn first, followed 1/60 second later by the field with the even-numbered lines. Although the two fields don't actually appear at the same time, the human brain interprets them as a single frame lasting 1/30 second.

**JPEG standard** A compression scheme proposed by the Joint Photographic Experts Group.

**Noninterlaced video** Typically used for high-quality computer-generated video.

**NTSC** The television standard currently in use in North America and Japan, an acronym for the National Television System Committee that created the standard. Detractors of the now-aging standard sometimes refer to it as "never the same color."

**Overlay** The process by which computer graphics are combined with video, to add titles and animation to a scene, for example.

**PAL/SECAM** These are foreign counterparts to the NTSC video standard. PAL (Phase Alternating Line) is primarily used in Western Europe while SECAM (Séquence de Couleurs avec Mémoire) is used in France, Eastern Europe, and the Soviet Union.

**Pixel** Short for picture element, equals one dot on a computer display. The AppleColor 13-inch monitor for the Macintosh II displays 640 pixels across and 480 down.

**Raster scan** The pattern in which a video screen is scanned, usually from the upper-left corner to the bottom right.

**RGB NTSC** This is NTSC color-composite video decoded into its red, green, blue, and sync components. Broadcast-quality systems tend to use this format because the image quality is higher.

**Refresh rate** The number of times per second that a video screen is repainted. NTSC video is shown at 30 frames per second while PAL and SECAM are displayed at 25 frames per second.

**Scan converter** A device that converts between video formats such as NTSC and PAL. These devices are usually very expensive.

**Scan lines** The individual lines in a video picture. They are composed of pixels in the computer world and analog signals in the video world. A set of scan lines makes up a field.

**SMPTE Time Code** A standard code, developed by the Society of Motion Picture and Television Engineers, used for identifying individual video frames in a sequence.

**S-Video** A form of NTSC video in which the chrominance (color) and luminance (brightness) signals are separated. S-Video produces slightly higher-quality images than color-composite NTSC.

**Sync** An electronic metronome used to keep video signals in step with one another. In the NTSC color-composite standard, sync is combined with the red, green, and blue signals. In RGB systems, the sync signal may exist separately or be combined with the green signal.

achieve a tremendous reduction by saving a code describing the image as consisting of one black pixel followed by 999,999 white pixels. Stored in this way, the file would be reduced to just a few bytes in size. Most real-world images are far more intricate than this

example. Still, using sophisticated image-analysis techniques, it's possible to achieve high compression ratios even with complex images.

An important factor that limits the degree to which an image can be compacted is the degree of compres-

sion loss. With many image-compression schemes, some details in the original image are lost when the file is compressed and decompressed. Compression algorithms that result in data loss are said to be destructive. For many video applications, the consid-



erable savings in file space is worth some minor image degradation. The *JPEG standard* is one destructive algorithm. The JPEG technique is sometimes referred to as discrete cosine transform compression. It relies on the fact that photographs and video images tend to change very little between neighboring pixels. Computer graphics, on the other hand, tend to change rapidly over small areas, such as in the black-to-white transitions between text characters and the surrounding space. Also, computerized data, such as bank records and computer programs, is extremely susceptible to destructive compression, which is why StuffIt obtains a compression ratio of only 2:1 or 3:1. By comparison, the JPEG algorithm achieves from 8:1 up to 25:1 compression.

Mac vendors are already exploring this technology. ImagePress, from Storm Technology of Palo Alto, uses JPEG in addition to other proprietary compression algorithms. Using software alone, ImagePress can compress a 1MB 24-bit file to 100K or less in under a minute. Also under development is a NuBus board that will achieve much faster compression times. C-Cube Microsystems also has software and a NuBus board based on JPEG. These boards will be exploited by software customized to work with them.


### On the Horizon

Despite the recent proliferation of video hardware for the Mac, you are unlikely to confuse a Macintosh with a TV set. Even if you view video on a studio monitor, image quality isn't nearly as good as it is on a Macintosh display. But that's about to change, thanks to the development of a new television system called HDTV, short for High Definition Television.

The subject of much public debate over the past few years, HDTV increases resolution by doubling the number of *scan lines* in an image. The improvement is stunning, especially when compared side-by-side with an NTSC picture. (Another benefit of HDTV is its wider aspect ratio, which is much closer to the shape of a movie screen.) Although implementation of an HDTV broadcasting system in the United States remains mired in controversy regarding NTSC compatibil-

ity and competing formats, industry watchers have little doubt that HDTV will arrive within five years. HDTV will, for the first time, make video monitors suitable for displaying unmodified computer graphics.

At the same time, consumer video equipment has become more computer-like, with remote controls and menus. Although forecasting is always risky, it's likely that a single monitor will someday replace today's separate video and computer monitors. And today's video tuners for the Macintosh

may herald the development of hardware incorporating video and computer functions in one piece of equipment. Stay tuned. 

See *Where to Buy* for contact information.

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**Peter S. Marx** is a developer of image-processing applications in Los Angeles.  
**Franklin N. Tessler**, a radiologist and Macworld contributing editor, watches ultrasound images by day and television in his spare time.

## VIDEO Q AND A

**Q.** What is the least expensive way of producing NTSC video from a Mac?

**A.** If you have a standard Apple video board and a Macintosh II, IIfx, IICx, IIci, or IIfx, you can produce low-quality, yet compatible, NTSC-compatible video for tape-recording. You need to have 32-bit QuickDraw and the NTSC INIT from Apple. Additionally, you must make your own output cable and be running in 1-bit graphics mode. As if this isn't hassle enough, you will also experience slower performance from the Mac.

The new generation of video boards from Apple, including the 8•24 and the 8•24GC boards, can produce video without the contortions needed in the above scenario. The Macintosh Portable is able to produce video with the addition of a video adapter available from Apple.

**Q.** How do you project onto a large screen from a Macintosh?

**A.** You need a Mac II, a multiscan projector (Sony, Panasonic, and Electrohome all produce these). You also need an encoder/decoder, to take the RGB signals from the Macintosh II's video board and convert them into signals compatible with the projector (see "Video-Product Roundup"). Typical rental on this equipment is \$500–\$700 per day in most large cities in the U.S.

**Q.** Can I capture color from a black-and-white frame grabber?

**A.** Both the Neotech Image Grabber and the Data Translation QuickCapture are able to capture color, albeit slowly. Working from a still video image, these boards capture three successive frames—for the red, green, and blue components—for each image.

In the case of the Neotech board, you need to have the Neotech Color Adapter Module, which can accept color-composite video and produce color images on the Macintosh II. With Data Translation's ColorCapture, you need RGB NTSC signals produced from composite video with an encoder/decoder.

**Q.** My Macintosh graphics look terrible when projected on my TV monitor. What's wrong?

**A.** Even with the best equipment at your disposal, when displaying Mac graphics on a television you'll achieve better results if you plan ahead. First, to avoid flicker, make all lines in the image at least two pixels wide. Also, be aware that television monitors typically omit the outer edges of a video picture, a process known as overscanning. To make sure that your precious graphics aren't lost in the conversion to NTSC, confine them to the central 80 percent of the Mac screen. Finally, to ensure legibility, avoid text smaller than 18 points.







# CONNECTING WITH IBM MAINFRAMES



**New products let IBM mainframes take advantage of the Mac**

In large corporations, the IBM mainframe—thanks to its abundance of processing power and disk storage space—is king. The mainframe holds all database information vital to the corporation, and often it acts as the central E-mail hub for companywide communication. But because the data on the mainframe is so important, users are always competing for computer resources. And sometimes even the most powerful IBM mainframe can't provide enough power.

Enter personal computers like the Macintosh. By acting as intelligent terminals via terminal-emulation software, Macs can offload processing from the mainframe. Initially, using a Mac to access a mainframe just meant that the mainframe didn't have to send as much information over the network to create a display. Now, thanks to more sophisticated Mac-to-IBM connectivity products, both the mainframe and the Mac can actually share the task of processing of data across a network.

## **Terminal Functionality**


Like older IBM 3270, Centralized Unit Terminal (CUT) terminals, Macs traditionally connect to mainframes with a bulky coaxial cable in a one-to-one fashion. The coax plugs in to an interface board in the Mac—such as one of the MacMainFrames from Avatar, Digital Communication Associates' (DCA) MacIrma, or the Apple Coax/Twinax Card—and into a coax port on an IBM 3174 *cluster controller*. Using a CUT-style terminal emulator, the connected Mac can run one host application, called a *session*, with the mainframe at a time.

An example of this traditional Mac-to-mainframe relationship is Simware's SimMac, originally named Mac3270. SimMac, which previously offered 3270 CUT terminal emulation only over asynchronous connections, now supports a variety of hardware links, including *protocol converters* and Apple, Avatar, and DCA coax interface boards.

Other players in 3270 terminal emulation for the Mac—Apple, Avatar, and DCA—now offer terminal emulators that support IBM's Distributed Function Terminal (DFT) specification. DFT terminals support multiple sessions over one peer-to-peer coax connection, so you can run more than one session at the same time.

In addition to multiple sessions, there's another advantage to DFT-style terminals. DFT emulators reduce communications traffic between terminals and the mainframe. They require less supervision from the mainframe and cluster controller be-





## Gateways reduce commu- nications traffic and cable costs

cause DFT terminals are more intelligent than CUT-style 3270 terminals. As a result, DFT terminals save computing resources on the host, enabling it to concentrate on running programs rather than on handling terminals.

Apple's MacDFT, Avatar's MacMainFrame family, and DCA's MacIrma all let you open up to four session windows simultaneously on the Mac. In addition, you can dedicate a fifth session to a LaserWriter. That capability lets you print jobs from the mainframe on a LaserWriter that's on an AppleTalk network.

### Party Line

You can reduce communications traffic even more—not to mention coaxial cable installation costs—between a mainframe and connected Macs by using *gateways*. In contrast to the one-to-one connections offered by coax interface boards, gateways link entire AppleTalk networks of Macs to a mainframe. The gateway provides the one point of connection to the mainframe's cluster control-

ler via either Synchronous Data Link Control (SDLC), token ring, or coax links, sending the mainframe's commands and data to the appropriate Macs on an AppleTalk network.

To use the gateway, Macs run the usual IBM terminal-emulation software discussed earlier. Thus the AppleTalk network serves not only as a way to connect multiple Macs, but also as a way for those Macs to access a mainframe.

When should you use a gateway instead of a traditional one-to-one coax connection? The most appropriate situation is when Macintosh users don't require mainframe access all the time. For instance, a user who checks E-mail on the mainframe or sometimes downloads data from a database doesn't need a permanent connection to the mainframe. A system programmer, however, might require access to the mainframe all the time. A gateway allows managers to distribute connections among users according to need. The gateway can replace hardwired coax links, without necessarily compromising the needs of full-time users.

Tri-Data Systems, with its Netway 1000AEX, was the first company to offer an IBM gateway for Mac. The Netway 1000AEX essentially took the place of an IBM 3174 cluster controller; it used the SDLC synchronous modem link to connect a network of Macs to the mainframe.

In the past year, however, four new gateways have appeared on the scene. Tri-Data's Netway 2000 is a total redesign of the Netway 1000AEX built around a Sun Microsystems' Scalar Processor ARCHitecture (SPARC) microprocessor. Thanks to the SPARC processing power, the Netway 2000 can handle four times as many sessions as before—64 versus 16. The Netway 2000 also supports AppleTalk connections other than LocalTalk, for example TokenTalk and EtherTalk.

Unlike Tri-Data's Netway 2000, Avatar's MacMainFrame gateways use software running on a Mac II to link networked Macs to an IBM mainframe. The Mac II must, of course, connect to both AppleTalk and the mainframe to perform its gateway tasks. On the mainframe side, MacMainFrame gateways support coax, token ring, or SDLC links. To attach to the Mac network, you can either use the Mac's built-in LocalTalk port, or add an Ethernet or token ring board.

One gateway Avatar offers, the MacMainFrame Coax Gateway, may seem strange because it's a five-session coax gateway. Certainly, a single DFT user can use all five sessions on a Mac. However, the gateway also allows those five sessions to be distributed among a maximum of five users, without requiring each user to have a separate coax interface board.

DCA's approach to gateways is similar to Avatar's, with three notable exceptions. First, DCA's MacIrmaLAN gateways don't support a coax con-

## IBM'S OTHER COMPUTERS

**E**ven though primarily known for its mainframes and PCs, IBM also makes a line of midrange or departmental computers. Although many older System/3X computers (System/34, /36, and /38 machines) have been displaced by the new family of AS/400 midrange computers—offering similar capabilities but a newer architecture—options exist for connecting Macs to both System/3X and AS/400 computers.

Midrange connections are made similarly to mainframe connections. The main difference is that the majority of midrange computer applications depend on the IBM 5250 terminal—not the IBM 3270 terminal. Just as 3270 terminal emulation is a popular path to Mac-to-IBM mainframe connectivity, IBM 5250 terminal emulation is a primary means of connecting a Mac to an IBM midrange computer.

Both Andrew/KMW Systems Corporation and IdeAssociates offer terminal-emulation and file-transfer software, as well as internal interface boards for Macs. In addition, Andrew/KMW recently merged with Emerald Technology, which also offers a 5250 board and software for the Mac.

Andrew/KMW, Perle Systems, and Protocol Computers produce external protocol converters. These devices convert the character strings from a Mac's terminal emulator into characters and commands that the midrange computer can understand and respond to.

Unlike in the Mac-to-IBM mainframe world, gateways have yet to appear for Macs and the IBM midrange systems in great numbers. The only option is Andrew/KMW's TwinAcess ApLINK, which allows a LocalTalk network of Macs running 5250 terminal emulators to share an interface board in a Mac II that in turn connects to an IBM midrange computer.



nection to the mainframe—only token ring or SDLC. Second, Macs wanting to access MacIrmaLAN gateways must be on either a LocalTalk or TokenTalk network; DCA currently does not support EtherTalk connections. Finally, because the gateways are based on existing IrmaLAN technology, the company uses a PC, not a Mac, as the gateway computer. For Macs to use the gateway, you must install an interface board in the gateway PC.

Despite the PC requirement, I don't see DCA's PC implementation of MacIrmaLAN as a significant hindrance to Mac-IBM connectivity. Companies with IBM mainframes tend to have Macs coexisting with PCs anyway. Using a PC clone as a gateway is cheaper than using a Mac II (as Avatar requires); in addition, PC token ring add-in boards are less expensive than their Mac counterparts.

From Novell comes yet another approach to gateway services—via IBM's grand plan for networking all types of computers, called Systems Application Architecture (SAA). Novell's Netware 386 Communication Services allows users of its Netware 386 network operating system to take advantage of SAA. Now that Novell also fully supports the Mac with Netware 386, anyone running a 3270 DFT-style terminal emulator on a Mac can access an IBM mainframe or AS/400 midrange computer via a token ring connection.

Another aspect of SAA is a scheme called Advanced Program-to-Program Communications (APPC). APPC allows computers on the network to communicate with each other as peers. APDA's MacAPPC provides programmers with the software tools necessary to develop APPC services for SAA networks. For example, by using MacAPPC, Mac applications can dynamically exchange information with IBM mainframe-based applications.

### Improving the Characters

So far, all I've really discussed is how to make a relatively simple connection from a Mac to an IBM mainframe. But that really is only the first step. The next is adapting the IBM user interface to better reflect the Mac interface.

Whether you use a direct coax link or a gateway, CUT- or DFT-style terminal emulation, you still face the standard character-based display of the IBM mainframe. Given enough time, dedicated users can master IBM mainframe commands. For occasional mainframe users, however, those often-arcane commands can be confusing and intimidating. The need for an easy-to-use interface, such as the Mac's, is therefore a compelling one.

Even IBM has recognized this necessity. OfficeVision presents the same interface on mainframes, minicomputers, and PS/2 computers, and is IBM's attempt to integrate different types of



DAN ESCOBAR

machines and operating systems. IBM currently lacks tools for integrating Macs into OfficeVision.

However, there are many other ways to provide a Mac-style interface to a mainframe application—including OfficeVision. Apple, Avatar, DCA, and Tri-Data all provide standard application programming interfaces (APIs) that enable developers to write customized Mac programs that use their own hardware. In general, programs that take advantage of APIs preserve both the interface of the Mac and the integrity of the mainframe data. Users can automate routine operations like logging on to and off of the mainframe, accessing E-mail, even downloading information from a mainframe database to a Mac application for analysis.

To simplify the development process somewhat, the APIs from these four vendors include HyperCard support, which makes it easier to prototype interfaces and applications for use with an IBM mainframe. But until a single API is offered for all Mac-to-IBM hardware, programmers must write different code for each vendor's interface boards. Luckily, there is a trend to one sole API—not surprisingly, Apple's 3270 API—which has been endorsed by Avatar, DCA, and Tri-Data.


### Higher-Level Tools

APIs aren't the only way to provide Mac interfaces to mainframe applications. Tools such as Mitem Corporation's MitemView, APDA's MacWorkStation, and Masquerade3270 from Connectivité Corporation fit the bill. In addition, Simware's SimMac offers a presentation capability that lets you design a more Mac-like interface to 3270 mainframe applications. Because these tools are more user-adaptable, they are often easier for both system programmers and end users to work with.

MitemView uses hardware-vendor APIs to

**At American President Systems in Oakland, California, programmers like Barry Polley are looking at several ways for Macs to access mainframe-based data. They've found developing a prototype graphical interface with MitemView and HyperCard takes about a day.**





## Thanks to APIs and HyperCard tools, Mac users won't see the IBM mainframe interface

control communications between a Mac and a mainframe. However, MitemView allows programmers to make maximum use of HyperCard with a series of HyperCard external commands (XCMDs). You define patterns of characters from the mainframe for a stack to recognize and respond to. Those patterns and responses, which are stored in the HyperCard stack, can then control different HyperCard displays of mainframe applications; the Mac user sees only the HyperCard displays.

With MacWorkStation, the actual IBM mainframe application issues commands relating to a user interface. Those commands are in turn received by the Mac, where a Mac application accepts them and turns them into typical Mac interface elements: windows, menus, and dialog boxes. Because both computers share in the processing load—the mainframe runs its application, and the Mac runs its application—and because the two applications communicate with each other, MacWorkStation is an example of a *distributed-processing* approach to Mac-IBM mainframe connectivity.

Originally developed for asynchronous serial communications, MacWorkStation now supports the block-mode data-transmission method typi-

cally associated with IBM mainframe communications. (IBM mainframes normally send data in blocks large enough to fill an entire terminal screen, rather than just character-by-character or line-by-line.) MacWorkStation's support for block-mode data transfers makes it easier for developers to handle incoming data when working with IBM mainframe applications.

Like MitemView, Masquerade3270 uses APIs to talk to the mainframe. However, Masquerade3270 offers a very different approach to creating Mac-like applications that communicate with an IBM mainframe. With Masquerade3270, the user controls the design process. First, you have Masquerade3270 save all the IBM screens from a session. Then, you define the appropriate inputs to those screens (for example, name and password for the log-on screen) and create dialog boxes for entering those inputs. Masquerade3270 even lets you design special icons for functions or windows for other data—such as an E-mail message—and combine those icons and windows in a stand-alone application.

SimMac's presentation capability, which Simware calls Views, allows programmers to associate a familiar Mac button, list, or pop-up menu with a script that carries out an entire series of mainframe commands. Scripts can automate communications, mainframe navigation, log-on procedures, and other tasks. As a result, Mac users don't have to work directly with the mainframe interface.

## IBM CONNECTIONS WITH TCP/IP

**I**BM has long maintained its own networking architecture, first called Systems Network Architecture (SNA). SNA is now incorporated in a larger IBM scheme called Systems Application Architecture (SAA).

While much of IBM's networking depends on physical links using SDLC, coaxial cable, and token ring, the company has recently begun to endorse Ethernet as another physical medium for connections. At the same time, IBM has started to support a popular Ethernet protocol, Transmission Control Protocol/Internet Protocol (TCP/IP), that's primarily used by UNIX computers. IBM's endorsement of TCP/IP coincides with the trend of large corporations looking to TCP/IP as the protocol for interoperability—that is, linking together dissimilar computers running dissimilar operating systems.

Macs can participate in TCP/IP links to IBM mainframes in two ways, terminal emulation and file services. For instance, Intercon System Corporation's TCP/Connect II terminal emulator includes a tn3270 option, which handles 3270-style terminal emulation over TCP/IP networks. Also, if an IBM mainframe is running Network File System (NFS) file-server software, a Mac can use the IBM computer as a file server. To do this, you need Cayman Systems' GatorBox gateway and GatorShare software. The GatorShare software allows the Mac users to see NFS file servers as AppleShare servers by converting between AppleShare requests on the user's side and NFS commands on the server's side.

### Other Pieces of the Puzzle

In addition to the distributed processing support offered by MacAPPC, which is designed to let corporate MIS departments create their own applications, access to E-mail and databases on IBM mainframes is becoming more distributed.

Anyone using a terminal emulator can readily access PROFS, IBM's popular mainframe E-mail system. CE Software, Microsoft, and TOPS have all announced gateways that allow their LAN-based E-mail systems to exchange messages with the PROFS mail system. CE Software is developing its own PROFS gateway for QuickMail 2.2, QM-Professional Gateway, while Soft-Switch is providing SNADS Gateway/MSMail, the PROFS gateways for Microsoft Mail 2.0, and is also developing a PROFS gateway for TOPS InBox 3.0.

Much of the corporate data in the United States resides on IBM mainframes. Accessing that data, however, isn't always simple or straightforward for Mac users. Using a product like Apple's Data Access Language (DAL, formerly known as CL/1), users of Excel, Wingz, 4th Dimension, and other databases and spreadsheets can request specific data from mainframe databases using Structured Query Language (SQL) and manipulate that data within their own Mac applications.



Oracle Corporation offers similar connections through the use of Oracle for the Mac.

### Keep Up with Big Blue

If you only have a few Macs connected to a mainframe, all you probably need is a standard coax connection. That's particularly true if you use the Mac as your primary mainframe terminal. Whenever possible, stick with DFT-style emulation because it uses less of the mainframe's resources.



JOHN HILLERY

At the University of Michigan in Ann Arbor, a campus-wide mail system is based around IBM mainframes. Programmers like Gordon Leacock used MacWorkStation so people could use the Mac's interface to access the mainframe.

## TALKING TO BIG IRON

### 3270 Terminal Emulation

#### Apple Computer

- Apple Coax/Twinax Card with MacDFT, \$1495
- MacDFT, \$245

#### Avatar Corporation

- MacMainFrame DFT, \$495 (software upgrade)
- MacMainFrame DX, \$1195
- MacMainFrame Graphics, \$1495
- MacMainFrame SDLC Workstation, \$1295
- MacMainFrame Token Ring Workstation, \$1295
- MacMainFrame II/CUT, \$995
- MacMainFrame II/DFT, \$1295
- MacMainFrame SE/CUT, \$995
- MacMainFrame SE/DFT, \$1295
- MacMainFrame SE/30/CUT, \$995
- MacMainFrame SE/30/DFT, \$1295

#### Digital Communication Associates

- Irmaprint 2, \$1795
- MacIrma \$1195
- MacIrma Graphics, \$1295
- MacIrma SE/30, \$1195
- MacIrma WorkStation, \$1395

#### Intercon Systems Corporation

- TCP/Connect II, \$495

#### Simware

- SimMac async version, \$265
- SimMac network version, \$340

### 3270 Gateways

#### Avatar Corporation

- MacMainFrame Coax Gateway, \$2495,<sup>1</sup>
- MacMainFrame SDLC Gateway, \$2495;<sup>2</sup> \$4495;<sup>3</sup> \$6495<sup>4</sup>

- MacMainFrame Token Ring Gateway, \$2495;<sup>2</sup> \$4495<sup>3</sup>

#### Digital Communication Associates

- MacIrmaLAN 802.2 Gateway Server, \$3995;<sup>5</sup> \$5995<sup>4</sup>
- MacIrmaLAN SDLC Gateway Server, \$4495;<sup>5</sup> \$6495<sup>4</sup>

#### Tri-Data Systems

- Netway 1000AEX, \$3995
- Netway 2000, \$9995

### 5250 Terminal Emulation

#### Andrew/KMW Systems Corporation

- NetAxxess, \$3995
- TwinAxxess, \$1095
- TwinAxxess Series II, \$1695-\$3595
- TwinAxxess Series III, \$1295

#### Emerald Technology

- MacTwin II, \$1095
- MacTwin SE, \$995

#### IdeAssociates

- Ideacomm Mac, \$1195

#### Perle Systems

- PDS 350/294, \$3995
- (4 ports)-\$11,795 (20 ports)
- Perle Model 3, \$1995
- (1 port)-\$3795 (7 ports)

#### Telematics International

- 5250/T, \$2925
- MacCOM \$1100-\$2500

### Other

#### APDA

- Data Access Language (DAL) Developer's Toolkit, \$695
- Data Access Language (DAL) Server for MVS/TSO, \$20,000

- Data Access Language (DAL)

- Server for VM/CMS, \$15,000

- MacAPPC Developer's Kit, \$2500<sup>6</sup>

- MacWorkStation Developer's Kit, \$2500<sup>6</sup>

- MacX25, \$800

- MacAPPC Evaluation Kit, \$100<sup>7</sup>

- MacWorkStation Evaluation Kit, \$100<sup>7</sup>

#### Apple Computer

- Apple Serial NB Card, \$1195
- TokenTalk NB Card, \$1250

#### Avatar Corporation

- MacPROFF, \$195

#### Cayman Systems

- GatorShare, \$1995

#### CE Software

- QM-Professional Gateway, NA

#### Connectivité Corporation

- Masquerade3270 developer package, \$400-\$1200
- Masquerade3270 user modules, \$200-\$500

#### Digital Communication Associates

- MacIrma API, \$195

#### Mitem Corporation

- MitemView, \$995

#### Novell

- Netware 386 Communication Services, NA

#### Oracle Corporation

- Oracle for the Mac, \$699 (database); \$999 (network)

#### Soft-Switch

- SNADS Gateway/MS Mail, NA

#### Tri-Data Systems

- Netway API Developer's Toolkit, \$495

<sup>1</sup>5 sessions. <sup>2</sup>8 sessions <sup>3</sup>32 sessions. <sup>4</sup>64 sessions. <sup>5</sup>16 sessions. <sup>6</sup>Contact Apple for site-license information. <sup>7</sup>Single-user license.



**It's getting  
easier to  
connect  
Macs and  
IBM main-  
frames**

On the other hand, if you have a network of Macs, all of which only occasionally access the mainframe, then a gateway—even a coax gateway—is a good choice. SDLC gateways are particularly useful for companies that need to connect regional offices to a centralized mainframe; with the right equipment, you can get connection speeds of up to 56 kilobits per second (kbps).

Terminal emulation and file transfers over a token ring connection are generally faster than over a coax connection, but I think that's little

reason to go out and install a token ring network. Token ring gateways for the Mac are aimed at installations that already have a token ring installed, say for connecting mainframes and PCs.

If you're interested in changing the interface to IBM applications, MacWorkStation is probably the most powerful tool for creating a Mac interface to mainframe programs, but it requires writing code on both the Mac and the mainframe. Many corporations that use mainframes are reluctant to modify all of their existing programs in order to support MacWorkStation.

In such situations, MitemView, Masquerade3270, or SimMac is a better solution, since these programs require no modification on the mainframe side. To the mainframe, a Mac appears as just another terminal; the Mac handles all interface elements.

MitemView's intelligence revolves around recognizing strings of characters. Defining those strings and the appropriate responses in IBM communications is a task probably better left to a programmer than to an end user. However, MitemView also supports VAXs, and even bulletin boards, and can provide interface consistency for a large variety of connections.

SimMac's big advantage is that it runs on a 1-megabyte Mac and over asynchronous connections with a mainframe. It also supports multiple windows, color, and large-screen monitors on the Mac. Simware offers a PC version of SimMac, SimPC, that features similar capabilities.

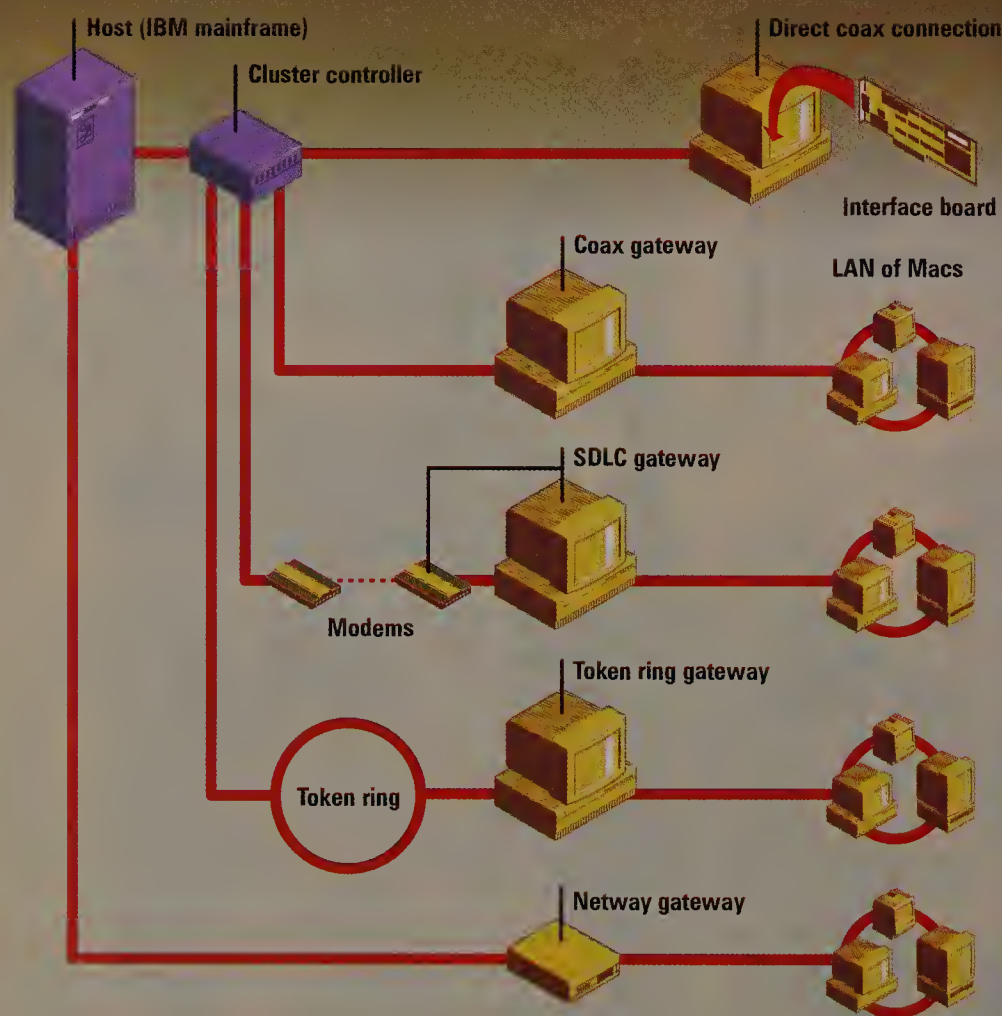
Masquerade3270 deals with the IBM screens familiar to any user of an IBM terminal and has simple—but powerful—tools for linking user responses to those screens. You can use Masquerade3270 to create stand-alone applications smaller than MitemView HyperCard stacks. Masquerade3270 has my vote as the easiest tool with which users can define their own interface to an IBM mainframe.

Picking the right Mac-to-IBM solution isn't easy, especially since so many new connectivity solutions have appeared in the past year. One thing is for sure, though: connectivity solutions between a Mac and IBM mainframe have improved. Just as software that makes it easier to use Macs as front ends to mainframe databases is coming into its own, so too are the hardware bridges that connect the Mac to corporate networks ruled by the IBM mainframe. **M**

See *Where to Buy* under Mac to IBM for contact information.

.....  
**Dave Kosiur**, a Macworld contributing editor, is the editor of *Connections*, a technical journal on Macintosh networking.

## MAC-TO-MAINFRAME CONNECTIONS

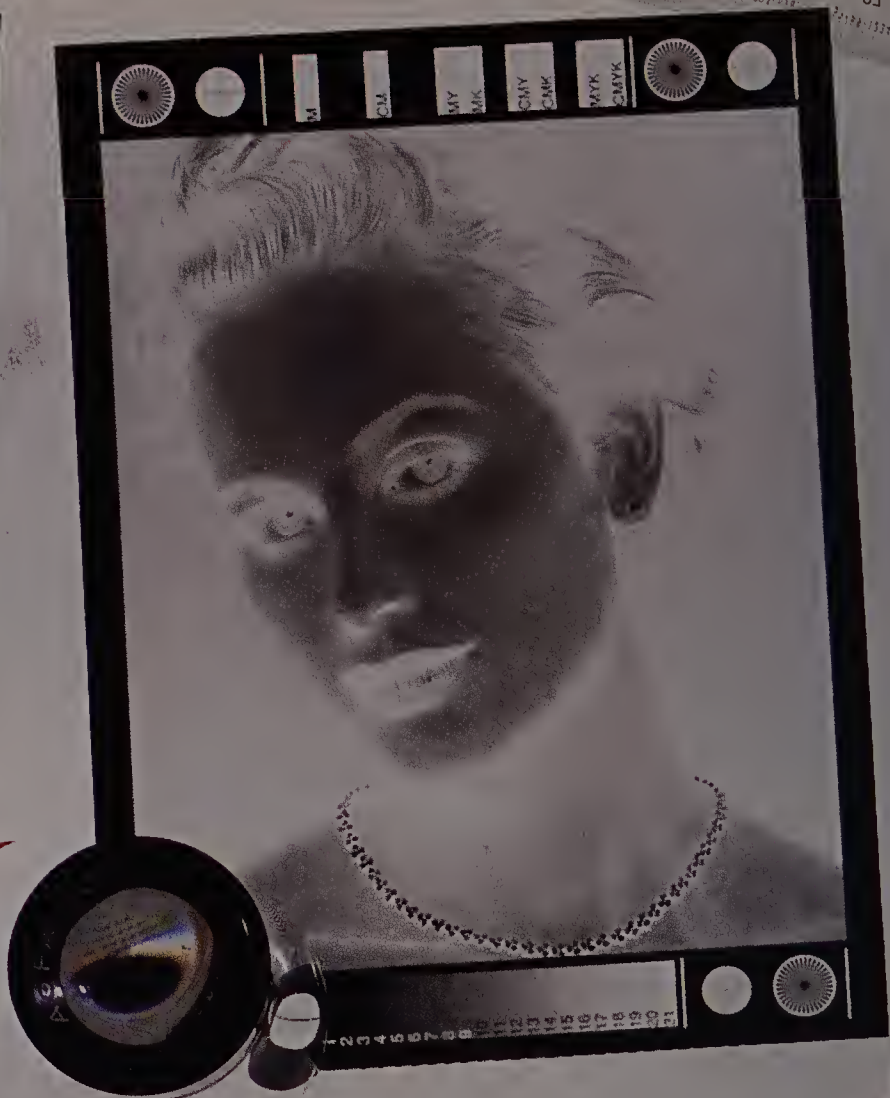
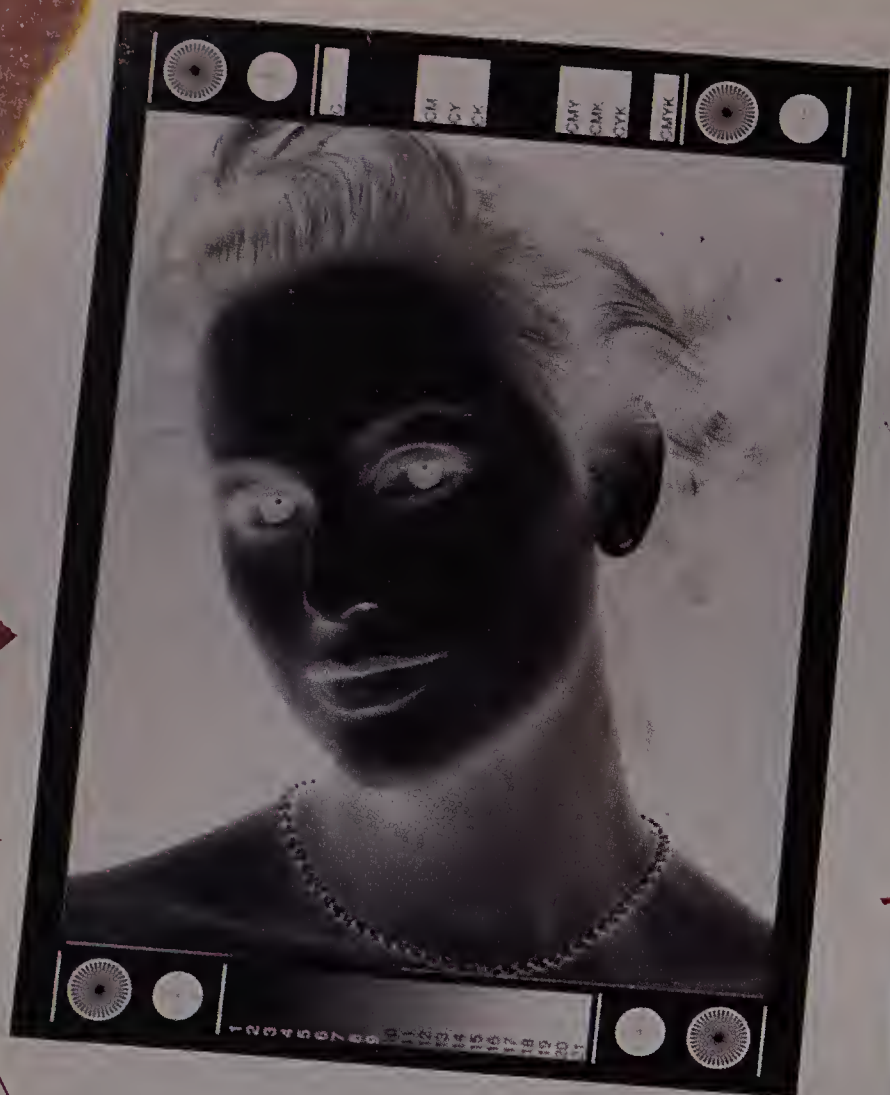


There are two primary ways to connect Macs to an IBM mainframe. The first, a direct coaxial link, is a one-to-one connection; it requires an add-in interface board in each Mac. The second, a gateway, allows any Mac on an AppleTalk network to access the mainframe via a variety of connections—coax, SDLC, or token ring. The gateway can be either a stand-alone hardware device—like Tri-Data's Netway 2000—or a computer running special software along with the appropriate hardware interface (for example, a token ring interface board). Avatar's MacMainFrame gateways run on a Mac and support the three types of connections (coax, SDLC, and token ring). DCA's MacIrmaLAN requires an IBM PC (or a PC clone) and supports either SDLC or token ring. The Netway 2000 gateway is the only device that does not require a cluster controller; it can connect directly to the mainframe.



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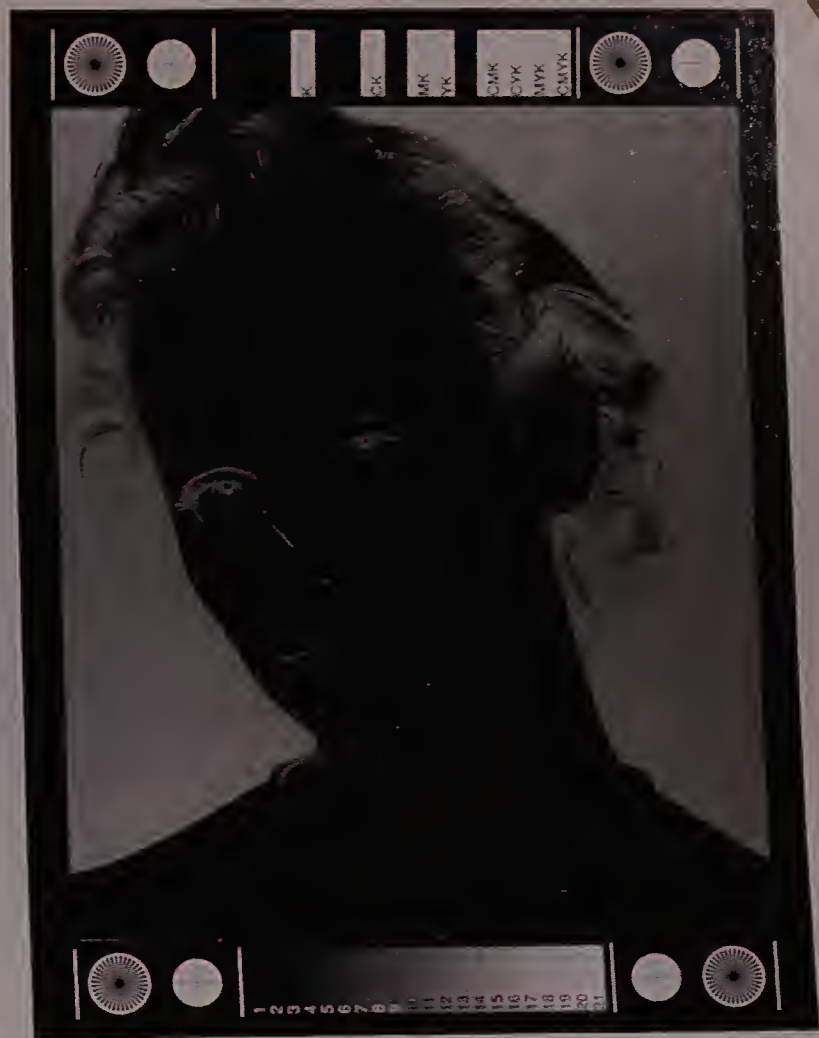
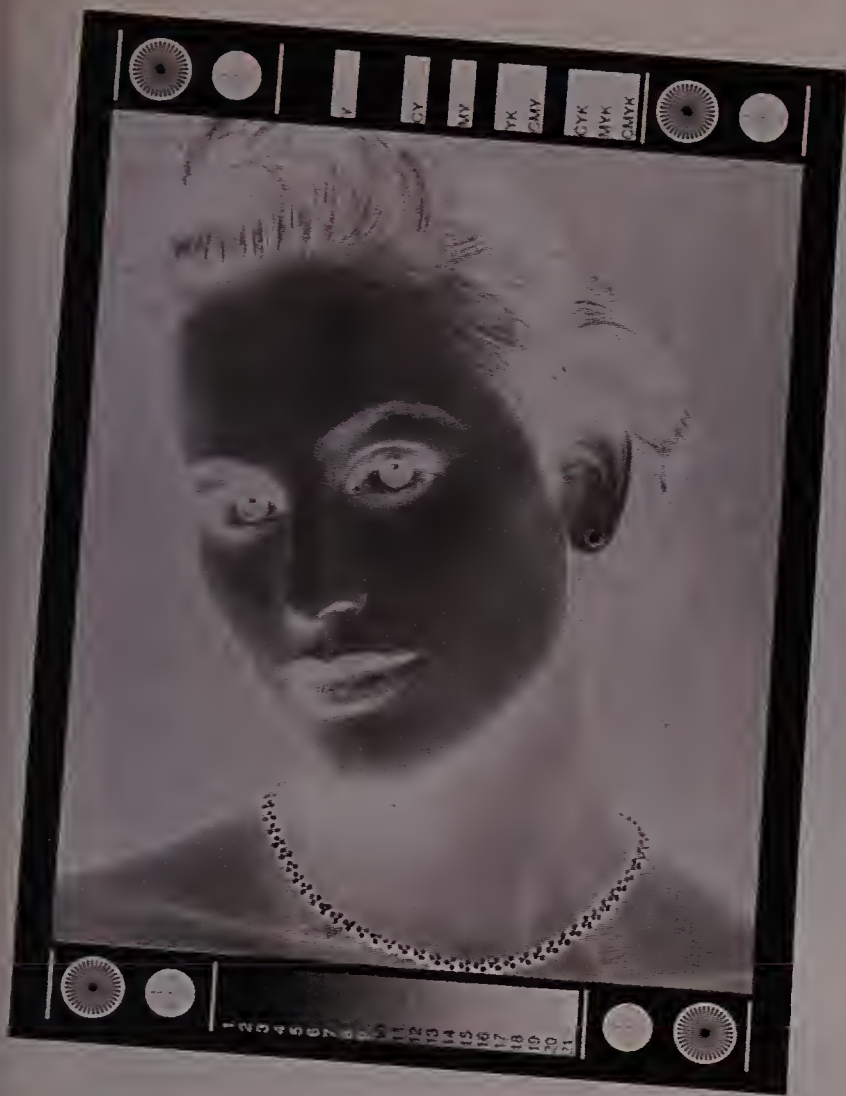
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# REVIEWS



## Portable Laptop Macintosh

### OUTBOUND LAPTOP SYSTEM

**Pros:** Smallest, lightest, least expensive true Macintosh portable; backlit screen; good documentation; well-engineered removable battery system; great carrying case. **Cons:** Requires the chips from an SE or Mac Plus; some screen shadowing and cursor "submarining." **Company:** Outbound Systems. **Requires:** Mac Plus or Mac SE. **List price:** \$2999 (with 1MB floppy drive); \$3999 (with 40MB hard drive).



Everybody—even Apple—agrees that the Macintosh Portable isn't the ideal portable Mac. It's too expensive, too heavy, and too big to whip open in an airplane seat.

Yet without access to proprietary Apple technology, how is any third-party company expected to engineer a true Macintosh that's smaller, lighter, and less expensive?

Outbound Systems' approach is to commandeer the ROM chips from a Mac Plus or SE you already own. The result is an impressive 9-pound battery-powered laptop that runs for three hours per charge and is actually usable on a plane, in a cab, or even in a phone booth.

#### What You Pay

Becoming an Outbound owner isn't quite as simple as picking one up at the local LaptopMart. First of all, you must own or buy the Mac Plus or Mac SE that's going to donate its chips. Next, you purchase the Outbound itself—about \$3000 with a floppy drive or \$4000 with a 40MB hard drive. The price includes installation by a dealer who performs the ROM surgery and gives you an Outbound lesson.

After the operation, the donor Mac only runs when it's docked, that is, when it's connected by a cable to the Outbound. When the computers are docked, their screens act like dual monitors, they share whatever peripherals are connected to the Plus or SE, and the combined memory of both machines is available. Though the solidly click-locking Mac-to-Outbound cable transfers information about ten times as fast as SCSI cables, there's still a slight delay when you open a window. Otherwise, you won't notice any difference except perhaps that the original Mac now runs at the Outbound's twice-as-fast processor speed.

#### What You Get

When the two computers are not docked, however, you'll remember why you endured the hardware hassle. The Outbound is indeed a small, lightweight, truly portable Macintosh. Its removable, rechargeable battery lasts about three hours on a charge, and it's automatically recharged whenever the AC adapter is connected (even when you're using the Outbound). A desk accessory that keeps track of the remaining battery time and a series of alert boxes constitute an excellent early-warning system for letting you know when you're running out of juice.

The detachable Outbound keyboard clips to the face of the CPU unit when you're traveling. It's a wireless infrared keyboard; there's something magical about typing on it and watching letters appear on the screen a couple of feet away (a keyboard cable is provided in case the magic boggles your mind too much). Instead of a mouse, you use a thin rolling cylinder called an Isopoint, located just beneath the spacebar. Slide this corrugated straw from side to side with your thumb for horizontal cursor move-

ment, logroll it up or down for vertical cursor movement, or press down on it to click. Like any substitute pointing device, it's not a mouse—for example, there's no way it will work with MacPaint. In fact, it feels sort of cheap. But it certainly doesn't consume any desk or lap space, and it generally gets the job done. (A mouse is available as an option, free if you order an Outbound by August 31.)

The Outbound's supertwist LCD display isn't a big hit with Mac perfectionists. It suffers slightly from fading-cursor syndrome when you roll the Isopoint, and you see faint rectangular shadows of open windows. But it's backlit, so you can see what you're doing in darker places (and from wider angles) than you can using the non-backlit Mac Portable. When you've set the contrast properly from the Control Panel, the Outbound screen pixels are crisp and black. To save power, you can set the backlighting to go out and the hard drive to spin down when the Outbound has been idle for a certain number of minutes.

#### What You Sacrifice

The Outbound is incompatible with some copy-protected software (mainly games). There's no SCSI port on the unit ("yet," says the company). There are standard modem and printer ports, but the laptop doesn't have normal Mac ADB jacks. So unless the Outbound is docked, you can't use your regular Mac's mouse or keyboard. And the Outbound keyboard lacks function keys and a numeric keypad—there's no room. Remember, too, that if you have the hard disk-equipped Outbound, you can only load files onto the laptop when it's docked to the Plus or SE; if you have the floppy drive Outbound, you can't have a hard drive. However, either model can have a silicon disk—an internal RAM disk that





**The Outbound Laptop System**

preserves data even when the computer is off—of up to 16MB.

#### Engineering Niceties

The Outbound isn't beautiful—especially compared with the Macintosh Portable. Holding an Outbound, you become aware of the engineering necessary to cram a complete Macintosh into something the size of the Manhattan phone book. Almost every surface is occupied by the screen, the ports, a flip-out foot (to hold the CPU upright), the handle, and so on.

When you actually use the laptop, however, you realize that its internal design is quite sophisticated. For example, the Outbound uses standard camcorder batteries that can be picked up at any electronics store, and no data is lost when you change batteries—theoretically, with enough of them, you could go all day without being near an outlet. Another example: the Outbound doesn't require special memory chips like the Macintosh Portable. Both system RAM and the RAM that constitutes the silicon disk use standard SIMMs. And in the attention-to-detail department, check out the \$119 carrying case. It's one incredibly thoughtfully designed piece of luggage.

It would be safe to call the Outbound a rugged machine, designed to be toted and even operated under

bumpy conditions. But not every Outbound is perfect when it rolls off the assembly line. Fortunately, you're shielded from getting an Outbound that has, for example, a defective screen; the dealer who sells you the unit is supposed to test every Outbound and sell it only if it works perfectly. The Outbound also has a one-year parts-and-labor warranty.

#### Outward Bound

We may as well accept that there is no such thing as a no-compromise laptop Macintosh: if the cost doesn't get you, the size and weight will. If you want a complete self-contained computer, your choices begin with the \$5500 base-model Colby and run all the way to the \$9000, AC-power-only Dynamac. None, especially the Macintosh Portable, holds a candle to the Outbound's portability, both in terms of size (12 by 8 by 3.6 inches) and weight (9 pounds including battery). And none costs less. You could buy a floppy-drive Outbound (\$3000) and a Mac Plus (around \$1000) and still come thousands under the least-expensive alternative.

The Outbound's particular set of compromises—a couple of nonstandard ports, a nonextended keyboard, and the mutual exclusivity of a floppy or hard drive—render it a satellite computer. That is, it's an exception-

ally functional grab-and-go device that requires little fuss or thought but is best considered as the ultimate peripheral to a real Mac. Outbound Systems itself is run by very smart people who are obsessed with customer satisfaction, and they have plans for some terrific additions to the product line (such as a device that will enable your laptop to dial your post-operative Plus remotely to transfer files). Chances are good that once you try an Outbound, you'll want one—and once you have one, you'll be the happiest passenger on the plane.

—David Pogue

See Where to Buy or circle 826 on reader service card.



#### Desktop Publishing Program

### ALDUS PAGEMAKER 4.0

**Pros:** Improved typographic controls; improved text editing; new linking, indexing, and table-of-contents features; new version-control features; excellent manuals and online help. **Cons:** No dialog boxes for precise element positioning or resizing; allows only one open document at a time; text rotation in 90-degree increments only; no editing of tracking or kerning tables; online help doesn't work when a dialog box is open; uses 5MB to 6MB of hard disk space; some operations are sluggish on 1MB Mac Pluses and SEs; disk errors can result in lost work. **Company:** Aldus Corporation. **Requires:** Mac Plus; hard disk. 2MB RAM recommended. **List price:** \$795.



Aldus PageMaker, long a desktop publishing favorite, has also received its share of criticism, especially from people who prefer its closest competitor, QuarkXPress. The complaints are familiar: PageMaker can't handle lengthy publications. Its minimal word processing features make it impractical to extensively edit text that you've placed. It doesn't offer precise control over word and character spacing. It doesn't allow you to rotate, stretch, or condense text. It doesn't support fractional type sizes such as 10<sup>1</sup>/<sub>2</sub> points.

With PageMaker version 4.0, Aldus has addressed the aforementioned shortcomings, but without sacrificing *(continues)*



the program's appealing click-and-drag layout style. If you liked PageMaker before, you'll like it even more now—although you may want to upgrade your hardware to handle the program's increased girth. If you've been using QuarkXPress or Letraset's DesignStudio or ReadySetGo, you may want to give Aldus PageMaker a second look. And if you're shopping for your first publishing program, you'll find PageMaker's mix of power and simplicity hard to beat—provided your hardware can accommodate it.

### Familiar Surroundings

Anyone familiar with previous versions will feel right at home with 4.0. The pasteboard—that electronic layout table upon which you place text and graphics—is identical, as are its surroundings: page-number icons line the bottom of the document window, and a toolbox of icons lets you edit text, crop graphics, and draw lines and various shapes. The menus are similar, too, although most have additional commands.

But you'll notice one big difference between PageMaker 4.0 and its predecessors before you even start the program. It uses a whopping 5MB of disk space—2MB more than version 3.0. PageMaker 4.0 has a healthier appetite for memory, too. It runs on a 1MB Mac, but slowly; 2MB is a more realistic configuration. And if you're working with long publications, compiling indexes and tables of contents, or doing extensive text editing with PageMaker, you'll probably want a 68020- or 030-based Mac.

### What's the Story?

Previous versions of Aldus PageMaker seemed to ignore the fact that you often need to make last-minute edits after text is laid out. The story editor, a built-in mini-word processor, changes all that. Triple-clicking on a pasted-down text block or choosing the Edit Story command opens a window containing the text, displayed in a single font and size for fast scrolling (see "Changing Your Story"). Within the story editor, you can use PageMaker's new, 100,000-word spelling checker and its new search-and-replace commands, which also let you search for and change text attributes.

QuarkXPress and DesignStudio provide similar word processing features; indeed, DesignStudio also has a glossary for quick entry of often-used text. But only PageMaker provides a separate window for text editing, and it's a superior approach because it lets you access all the text from a given story by simply scrolling. You need not move between different pasted-up pages, for example, or scroll from the bottom of one column to the top of the next.

Better still, the story editor doesn't apply editing changes to the layout until you reactivate the layout window. And by showing all text in one font and size, the story editor makes it easier to edit tiny footnotes, tightly kerned headlines, and other text elements that are difficult to edit directly on a layout.

### More Text-Tweaking Power

At last, PageMaker's basic text formatting features compare favorably to its competitors'. You can choose point size and leading values in 1/10-point increments, versus the 1/2-point increments in PageMaker 3.02. PageMaker 4.0 supports a maximum font size of 650-point, versus 3.0's 127-point limit. QuarkXPress's maximum point size is 500; DesignStudio's is 327.

Like DesignStudio and QuarkXPress 2.1 and 3.0, Aldus PageMaker 4.0 provides a tracking feature for improving the spacing of text. Unlike the tracking features in earlier versions of QuarkXPress and ReadySetGo, which simply let you increase or reduce the space between characters,

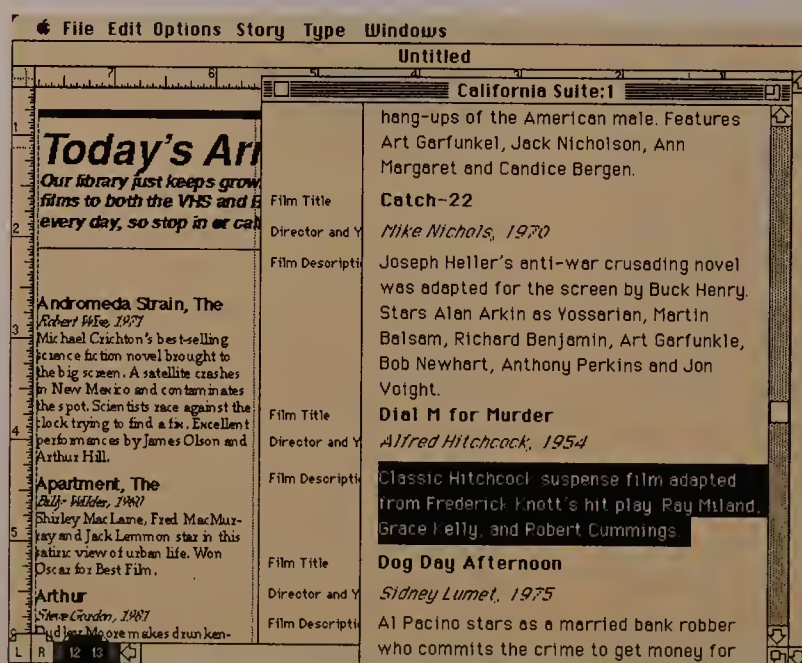
PageMaker 4.0 provides true tracking, which adjusts character spacing depending on the type size—the spacing of large sizes is altered more than that of small ones. PageMaker offers five levels of tracking, ranging from Very Loose to Very Tight. Unlike DesignStudio and QuarkXPress versions 2.1 and 3.0, PageMaker doesn't let you alter its tracking levels to suit your tastes, but that isn't a significant drawback. PageMaker's preset tracking levels yield excellent results. Between them and the program's manual-kerning features, which adjust spacing in increments as small as 1/100 em, most users will have all the control over character spacing they need.

The Paragraph dialog box provides new options that let you automatically draw rules above and below a paragraph or line and specify that certain lines be kept together on a page or in a column. And now you can rotate text, albeit only in 90-degree increments; QuarkXPress and DesignStudio allow free rotation to any angle.

### You Can Make Book on It

PageMaker 4.0's unique book-production features shatter the program's reputation for being suitable only for small jobs. Publications can have up to 999 pages (versus 3.0's 128-page limit), and the new Book command lets you define a list of individual publication files that, when combined, make up a book. PageMaker numbers pages appropriately across publication files, and at printing time lets you choose between printing just the open

(continues)



### Changing Your Story

The story editor lets you revise text without having to scroll around a layout. If a story uses style sheets, you can optionally display their names next to the paragraphs they apply to. You can also import word processor files into a story editor window and create new stories from scratch.



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publication or the entire book.

Also unlike the competition, PageMaker 4.0 can generate indexes and tables of contents. You can designate index and table-of-contents entries within PageMaker, or you can import Microsoft Word 4.0 files containing existing entries. Compiling the entries is a matter of simply choosing the appropriate command and specifying the desired format. PageMaker then "loads" the mouse pointer with the index or table of contents, which you can place by clicking on the page.

For keeping large (and for that matter, small) publications up to date, PageMaker 4.0 adds several new commands that let you examine and change the links between external word processor and graphics files and the publication you place them in. You can tell PageMaker to update a publication automatically whenever you alter an original text or graphics file. DesignStudio offers no such options; QuarkXPress 3.0 can update a publication when you change an external graphics file, but not a text file.

#### Other Goodies—And Not-So-Goodies

The list of new features in PageMaker 4.0 goes on. Graphics can be placed so that they move with the text that's associated with them. Printing is more straightforward than before, with several new options that streamline printing at service bureaus or other remote sites. Color capabilities are improved, with support for the Pantone Matching System and Aldus's PrePrint application, which produces four-color separations. PageMaker includes a separate application, Table Editor, that simplifies creating tables, schedules, and forms. And a gateway to the Microsoft Mail electronic-mail software lets you send and receive publications directly within PageMaker.

But unlike its competitors, PageMaker still doesn't let you resize or reposition a graphic or block of text by typing measurement values into a dialog box. Those operations remain strictly mouse oriented. It's true that the mouse is a more responsive positioning and sizing tool, and it's true that PageMaker 4.0's rulers are extremely accurate positioning aids (accurate to within .0003 inch). But many users feel that typing in size and posi-

tion values provides greater precision.

Finally, a couple of quirks—one annoying, one potentially devastating. The annoyance concerns PageMaker's online help. It's a great improvement over the help systems in earlier versions, but the help key sequences (⌘-? or the extended keyboard's Help key) don't work when a dialog box is open. To get help for such an option, you have to back your way out of the dialog boxes, then use the Help key.

A far more serious problem surfaces when a disk error occurs while PageMaker is saving a file. Instead of giving you a chance to save the file onto another disk, PageMaker simply reports the error and then quits, sending unsaved work into oblivion. Aldus says that's not a bug, but a feature designed to avoid corrupted publication files, and that you can usually recover work by opening the temporary file that PageMaker creates in the System Folder. Unfortunately, that's not mentioned in the otherwise excellent documentation.

These flaws aside, Aldus PageMaker 4.0 is a superb effort that balances industrial-strength text-handling features with a responsive and intuitive operating style. You'll be hard pressed to find another program that does so much so well. Just remember to save your work often.—**Jim Heid**

See Where to Buy or circle 706 on reader service card.

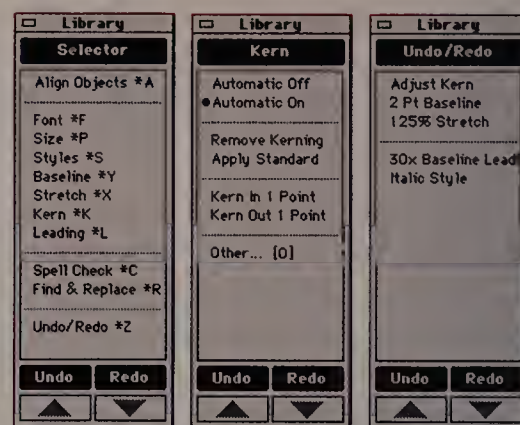
#### ★ Page-Makeup Software

### PUBLISH IT EASY 1.10

**Pros:** Inexpensive; includes drawing, painting, writing, and page-layout tools; innovative, highly interactive interface; multiple levels of undo for text formatting. **Cons:** Does not have fine typography, custom page sizes, automatic "continues" lines, style sheets, or support for gray-scale TIFF; ruler guides are limited and unwieldy. **Company:** Timeworks. **Requires:** Mac 512KE. **List price:** \$199.95.



When writing about Publish It, it's always a challenge to avoid dropping into a straight feature list. Most people refer to it as the Swiss army knife of desktop publishing, and because it includes



#### *In the Library with the Text Tool*

**Publish It Easy's Library palette lets you make most of your changes to text formatting without resorting to menus and dialog boxes. Click on any item in the Selector, and you can control that aspect of text formatting. Click on Undo/Redo, and you can selectively undo changes you've made in that text frame.**

robust tools for page layout, text editing, drawing, and painting, that moniker is appropriate.

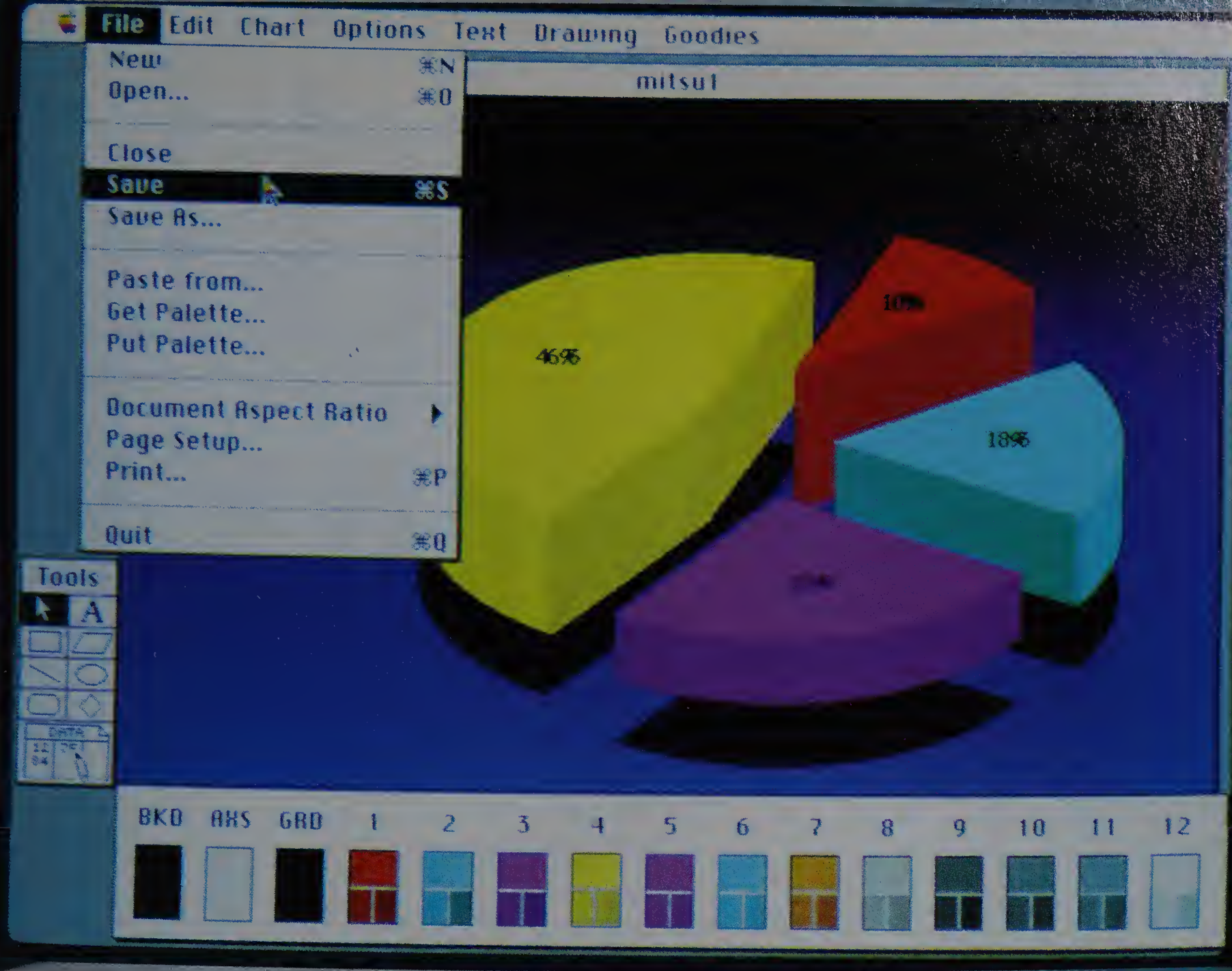
Almost in the same breath, though, people bemoan Publish It's clunky, cluttered interface. Clunkiness is hard to avoid with so many features, but it does make the program hard to use. Timeworks has addressed these complaints admirably in its latest product, a streamlined, pared-down, inexpensive version of Publish It by the name of Publish It Easy.

While removing features was one method of simplifying the program, Timeworks hasn't stripped it of its jack-of-all-trades ambience. It still has a more-than-impressive toolbox and feature list—enough to keep most nonprofessional page makers happy. Its tools for drawing, object alignment, and rotation (text or graphics, in 1-degree increments), in particular, put it ahead of some of the big guns.

#### **Text Tools**

There's good text editing, including Find and Replace, a good spelling checker, and even a thesaurus (Thesaurus Rex). With Find and Replace you can search for and replace any character, word, phrase, or type style with any combination of character, word, phrase, and type style. Text formatting includes most of the controls that casual users need, plus some nice bells and whistles like automatic and manual kerning (in full-point increments only), baseline shifts, and ex-*(continues)*





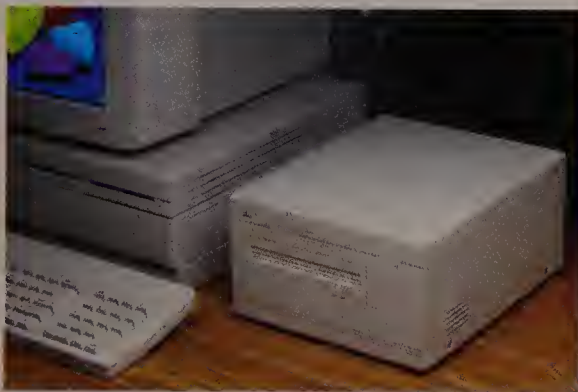
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panded or condensed type (1 percent increments). There are import filters for MacWrite, Microsoft Word (3 and 4), WordPerfect for the Macintosh, WriteNow, and even Excel. Hyphenation is a batch, rather than an interactive, process—select the text and use the Insert Hyphens command—but it's speedy and pretty smart.

Publish It Easy imports all the standard graphics files, with the notable exception of gray-scale TIFF. It only offers seven standard colors, and even though you can print to a color printer, don't expect spot color overlays; printing is basic and limited.

### Innovative Interface

The most important changes aren't really in what's been left out; they're in the interface. More than anything, Easy stands out for its interactivity. It's great for casual users, who often find themselves trying things out on the page, rather than plotting everything in advance. As you resize a text frame, for instance, the text reflows inside the frame; it doesn't wait for you to release the mouse button. Most dialog boxes let you see the results of your changes before you click on OK to close the box.

The text library is perhaps Publish It Easy's most innovative feature. You can adjust almost every text-formatting command—font, size, leading, kerning—by selecting it in the library. Change your mind? Just click on Undo/Redo to get a list of your changes to that frame's text so you can choose which to undo or redo. The feature is not entirely selective, though; if you undo the second-to-last change, for

instance, you also undo the last one. When you come back to that frame later, the Undo/Redo list is still there.

### Seeing What You Do

Easy is one of the few page-makeup programs that actually lets you see objects move as you drag them around on the page. This is one of PageMaker's great strengths, and while Easy isn't as fluid as PageMaker for moving objects—there's some halting jerkiness—it is smooth enough to be usable, except when dragging gray-scale PICTs. Bear in mind, though, that you'll need 2MB or more (or a stripped-down System) to make this effective. Under MultiFinder, at least, with the 683K that's recommended, Publish It Easy is constantly rebuilding the whole page as you move items.

### Few Failings

So what's wrong with Easy? Not a whole lot, especially considering the low (and heavily discounted) price. There are limitations—like its restriction to integral point sizes—that aren't a great problem for general business users, but some other things are more than annoying. The ruler guides (one horizontal and one vertical per document) are just as clunky and unusable as its older brother Publish It's. You can't create custom page sizes; you're limited to the standard sizes offered in the printing dialog box. There are no "continues" lines and no style sheets.

One problem that cropped up in early versions of Publish It seems to be rearing its head in Easy—text selection and cursor positioning. The cursor often appears in the wrong place, and it behaves idiosyncratically when you use cursor-movement keys together with the Shift key.

Easy is also a bit slow in some operations (such as text selection), but, surprisingly, most operations aren't a whole lot slower on a Mac Plus than on a II (hyphenation and other batch operations are notable exceptions). Easy runs well on Pluses and SEs, and the application itself weighs in at less than 290K on disk.

The problems with Publish It Easy are more annoyances than fatal flaws. Easy is a heck of a lot of page-layout program for a heck of a price. It's a

much better value than Springboard Publisher, at the same price, and it remains to be seen how it will compare with Silicon Beach's soon-to-be-released Personal Press. Easy's files are compatible with the full-blown version of Publish It, which is slated for an upgrade in the late fall. So there's even an upgrade path if you start with Easy and find it doesn't meet all your needs.—**Steve Roth**

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## ★ Word Processing Application

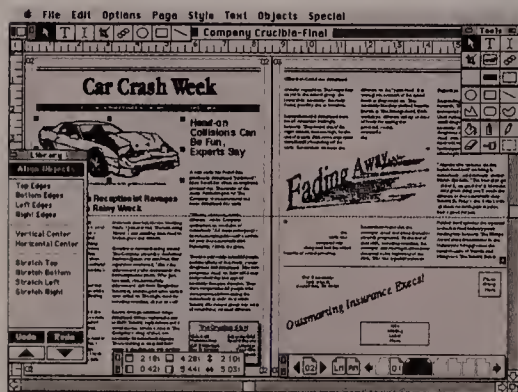
### WRITENOW 2.2

**Pros:** Compact; fast; nearly bug free; extremely intuitive. **Cons:** No style sheets or endnotes; text can't wrap around graphics. **Company:** T/Maker Company. **Requires:** Mac 512K. Second disk drive recommended. **List price:** \$199.



WriteNow is generally considered a low-end word processor. True, it lacks many of the features of its bigger (and more expensive) cousins, but with WriteNow 2.2 the low end has gotten pretty high. Ever since version 2.0, WriteNow has had an impressive list of features: virtually no limit to the number of windows you can have open, the ability to handle documents of 1000 or more pages comfortably, the ability to import and export documents in many different formats, automatically paginated WYSIWYG editing of documents with one to four columns, automatically numbered footnotes, multiple headers and footers, mail merge, word counting, smart quotes, smart cut and paste, an extensive spelling checker, flexible formatting, and versatile graphics support.

Version 2.2 adds to these capabilities with a font menu that displays each font name in its own face; improved menu organization; a number of new ⌘-key equivalents for menu items, ruler choices, and dialog box buttons; the ability to copy and paste styles; the ability to directly import files created by Microsoft Write and Microsoft Word 3.0 and 4.0 (even files saved using Word's Fast Save option); a spelling



### Power Palettes

You'll find plenty of palettes in Publish It Easy, including a choice of vertical or horizontal toolboxes. You can shrink or enlarge them with the zoom boxes, and turn them on and off selectively.





*“What’s in a name?”*



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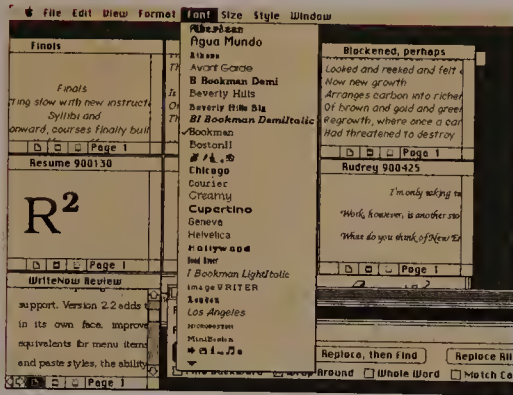


dictionary expanded to 135,000 words; a WriteNow-only version of Proximity's 1.4-million-word WordMaster thesaurus (including short definitions); ruler guides (vertical lines that help align tab stops); window cleanup that supports a variety of stacking and tiling options; and support for the extended keyboard. WriteNow 2.2 also remembers the size and location of a document's window, and new icons in the window frame make it easier to switch between document, header or footer, and footnote views.

## Good versus Great

The difference between a good word processor and a great word processor isn't just the litany of features, it's how well those features work for you. A great word processing application doesn't send you scrambling to the manual or online help for basic operations, or make you navigate dialog boxes or ⌘-key sequences when a single menu selection or keystroke should do, nor does it make you wait for operations you perform regularly. Though I own nearly all of the word processing programs available for the Mac, I rely on WriteNow far more than all the others. Most of the features I need are there. And when all I want is to type a term paper or a quick letter, WriteNow doesn't get in my way.

WriteNow carries out critical functions blindingly fast (and it keeps up with the fastest typing, too). The 80,000-word spelling checker checks even large documents in seconds. It remembers which words have already been checked (so rechecking a document after editing is practically instantaneous), and it can learn or forget a selection of words, which is great for maintaining custom dictionaries. Saving a document is particularly fast (a boon for paranoids like me), and Undo is also rapid. Undo seems to always be there when I need it, and it does (undoes?) what I expect it to. In addition to providing Undo, WriteNow lets you revert to the previously saved version or to the version before that (and, yes, you can undo the reversion). WriteNow is lean (it runs on a 512K Mac with two floppy drives or under MultiFinder with only a megabyte of memory), reliable, and above all, consistent.



## Tiling Windows

**WriteNow 2.2 adds the ability to overlay, stack, or tile windows in a variety of different styles; and the font menu displays each font family in its own face.**

## Does It or Doesn't It

WriteNow does what it does extremely well. Its main failings lie in what it doesn't do. Graphic images, for example, are treated just like characters within a line. You can resize them, move them vertically in 1-point increments within a line, or move them anywhere horizontally, but you cannot have more than one line of text adjacent to a graphic. In other words, WriteNow doesn't wrap text around graphics. Nor does it support margin lines or boxes around text. (Version 2.2 includes the handy booklet *Using WriteNow: Handbook of Tips & Techniques* [T/Maker Company, 1990], which contains clever, if not particularly Mac-like, workarounds for these graphics limitations.) Complex graphics tend to slow scrolling to a crawl, though a Hide Pictures command displays graphics as fast-scrolling gray rectangles. WriteNow 2.2 also lacks integrated outlining capability and cannot create endnotes. It doesn't support double underlining, strikethru text, or automatic line numbering, and it doesn't have table-generation features or style sheets (though copy and paste style helps here).

WriteNow achieves its rapid pagination at a price. The space reserved for the header and footer is equal to the tallest header or footer in the entire document plus an additional amount determined by the page wrap factor, an obscure number that can be set from the Page Setup dialog box. If you have unusual formatting requirements, WriteNow's pagination scheme can get in the way. Column support is also limited—you select one to four columns, but the selection applies to

the entire document, and all the columns must be the same width.

Though most of what WriteNow does is intuitive, a few functions are hidden. WriteNow can apply a font, size, or style change to all the text in a document that matches a certain style, but you would not know how to do it without reading the manual. (Use the Shift key while selecting the new style.) There is no online help.

Bugs are almost nonexistent. WriteNow 2.2 did introduce a conflict with Stepping Out II version 2.02 when not running under MultiFinder. There also can be a problem with printing multiple documents from the Finder: WriteNow will print only as many pages as there are in the first document selected (documents print out in alphabetical order of their file names). So if you're printing out the chapters of a manuscript and chapter one has only 10 pages but subsequent chapters are longer, WriteNow prints only the first 10 pages. To work around this problem you should give your chapters new file names alphabetized in descending order of size. (T/Maker is aware of the problem and will fix it in the next version.) Otherwise, WriteNow 2.2 is rock solid.

This was definitely the toughest review I've ever written. Before writing this, I had never fully realized just how much I like WriteNow. I have much more difficulty finding the bad points of a program I really like than I have had searching for good things in programs I don't care for. WriteNow 2.2 is simply the fastest, friendliest, most trouble-free word processing application I have ever used.

I've generated serious documents with MacWrite, Microsoft Word, WordMaker, FullWrite Professional, TeXtroff, WordPerfect, WordStar, and others. They all have features I'd like to have that are missing from WriteNow. But I noticed all of them—while I hardly noticed WriteNow at all before this review, though I've used it a lot more than any of the others. That's the highest praise I can give any word processing application. I even composed a 96-page book with WriteNow, and it looks as though the publisher might go to film directly from the file.—**Ron Risley**

**See Where to Buy or circle 874 on reader service card.**





File Edit View Special



My Disk



Sony NEWS Server



Trash

# Click here for power.

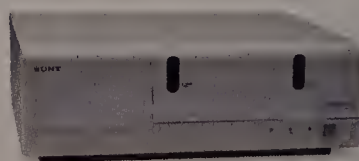
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Circle 133 on reader service card



★  
High-Capacity Erasable Optical Drive

## MACINSTOR ERASABLE OPTICAL

**Pros:** 53 percent more capacity than ANSI-standard 650MB systems; uses ANSI-standard cartridges; respectable selection of bundled disk-management software. **Cons:** Performance in ANSI mode is slow. **Company:** Storage Dimensions. **Requires:** Mac SE. **List price:** \$7995 (includes one formatted 1GB cartridge); additional cartridges \$395.

What's made in America, has 50 percent more interior room than any Japanese model, runs on either high-octane or regular, drag races past the competition, and features a price tag to match? One answer is the Cadillac of erasable opticals, the MacinStor Erasable Optical (EO) from Storage Dimensions.

Earlier this year *Macworld* reviewed erasable optical drives; all were Sony or Ricoh drive mechanisms with varying degrees of value added by American vendors (see "Erasable Opticals: New Light on Data," March 1990). The MacinStor EO, featuring a drive mechanism produced by Storage Dimensions' parent company Maxtor, offers some unique features that make it stand out from the clones.

### Extras

The MacinStor EO is conceptually similar to its competitors; all use a magneto-optical mechanism in which a sharply focused laser heats tiny spots for writing magnetic data, and another laser reads the data spots by examining polarized light reflecting off of them. This complicated scheme helps explain why these drives are expensive. In addition, the System regards each side as a separate volume. You have to eject the cartridge and turn it over to use the other side.

The MacinStor EO, however, can use a proprietary high-capacity cartridge (the so-called Tahiti format) in which each side has a final usable capacity of 442 megabytes. This is a bit more than 50 percent larger than the 287MB capacity typically offered by the ISO-ANSI 650 standard. The MacinStor EO needs no physical or software

modification to read 650-style cartridges, although you would normally take advantage of this capability only if you need to transfer data from drives that require standard cartridges. There's a read-write throughput slowdown of approximately 30 percent for ANSI cartridges.

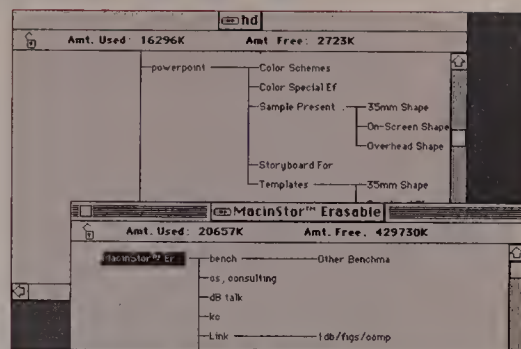
### Wide Open Spaces

Since the MacinStor drive comes with one preformatted cartridge, setup is effortless—you connect the drive, drag the MacinStor cdev into the System Folder, and restart. The first side of the cartridge now appears as a 442MB hard drive on the desktop. To manage these wide-open spaces, Storage Dimensions bundles Central Point Software's PC Tools Deluxe (an upgraded package, to be called Mac Tools Deluxe, should be out by the time you see this). A particularly helpful utility is Mirror/Rebuild, which stores directory information in special files that allow you to recover data in the event of a crash.

Data protection and crash insurance are, of course, crucial for storage systems of this size—if you worry about a modest 20MB hard disk failing, think about rebuilding half a gigabyte. At these prices, disk-management utilities must be adequate to the task, and it's comforting to see that Storage Dimensions takes this seriously.

### A Matter of Time

MacinStor EO's capacity is certainly nice to have, but your purchasing decision is also likely to depend on speed. I ran the same benchmark on the MacinStor EO that I used in the



### Forest for the Tree

One part of the Mac Tools utility in PC Tools Deluxe lets you toggle between tree and catalog listings of the disk's contents. Other utilities for backup and protection from data loss are also included.

March EO drive article; in four out of five tests the MacinStor EO is the fastest erasable optical now on the market.

On basic SCSI parameters, the MacinStor EO shows a faster read time than any other drive except the Pinnacle REO-650 equipped with an additional Opti-Cache SCSI accelerator; but the write time is comparable to that of an average Sony drive. In real-world tests, this combination gives the MacinStor first place in opening large PageMaker, Excel, and Illustrator files; another first in carrying out a search in 4th Dimension; but leaves the drive down in the lower half of the pack on copying 20MB of files from a hard disk. When the drive uses ANSI-650 cartridges instead of Storage Dimensions' high-capacity cartridges, however, the performance advantage diminishes.

### Spin Control

The MacinStor EO is big, and it's fast, and it costs about \$200 more than plain ANSI-650 erasable opticals (other manufacturers have recently announced 1GB opticals above and below the MacinStor's price). If you want the drive for a desktop application—storage and manipulation of color graphics, for example—speed and size are an important asset. If you are using erasable optical cartridges for interdepartment or interoffice data transfers, the MacinStor's size is again helpful, as you get the equivalent of three standard EO sides on a single cartridge. All in all, Storage Dimensions has done an impressive job of making an expensive product that's worth the money.—Charles Seiter

See Where to Buy or circle 783 on reader service card.



MacinStor Erasable Optical from Storage Dimensions

MARK JOHANNI



# Writing unlimited.



The freedom to write and think is for all of us. Now, there is a new word processor that's just **right** for us, too. It's called MacWrite® II, and it's made by Claris. MacWrite II makes it possible **to** share your ideas and thoughts with other computers and word processors. You'll be **free** to open documents from over 50 word processors, on all kinds of computers, with all kinds of **speech**, and work on them without reformatting.

**But** there's more you can do. (The feature **is** called XTND.) You can import graphics, not **only** from Macs, but many computers, **guaranteed**. And you can scale and crop them, **one** and all, in your MacWrite II document. In short, MacWrite II with XTND is a powerful **word processor** that lets you freely exchange text and graphics. You'll find also that your MacWrite II **lets** you change fonts, styles, sizes and colors, as well as text with its find/change feature. And **you** can create custom styles and save them as stationery — with all formats preset. You'll **share** your reports and letters quickly.

But what good is freedom of expression if you find **your** editing to be a hassle? That's why the page layout and editing is fully WYSIWYG: the **thoughts** you see are the thoughts you get. This WYSIWYG feature, by the way, is found only **with** MacWriteII. **It's** another way Claris simplifies word processing for you, whether you're **52**, 22, or 72.

**Called** upon daily MacWrite II smooths your writing assignments and **other** chores. There's **MacWrite II** spell checking, for example, and foreign dictionary **programs** that are optional, **and** a host of other features that come standard. (Like a thesaurus, and a mail merge feature **you'll** discover saves lots of time.)

What it adds up to, you'll **find**, is a simple and powerful tool designed for people. All the people. It is for writers, and **it** is for business people. And it is for those of us in between. The freedom to write is **liberating**. Now technology is, too.

CLARIS®



★  
Grammar Checkers

## CORRECT GRAMMAR FOR THE MACINTOSH 1.0.1

**Pros:** Works with wide variety of word processor formats; can find errors in complex sentences; facilitates interactive editing. **Cons:** Makes suggestions that would make good sentences ungrammatical. **Company:** Lifetree Software. **Requires:** Mac Plus; hard disk. **List price:** \$79.

## GRAMMATIK MAC 1.0

**Pros:** Offers several editing options, including interactive and offline. **Cons:** Small font in interactive Edit Window; misses many errors, especially in complex sentences. **Company:** Reference Software International. **Requires:** Mac Plus; second disk drive. Hard disk recommended. **List price:** \$99.

## RIGHTWRITER FOR THE MAC 3.1

**Pros:** Requires only 512K of memory. **Cons:** Catches few grammatical errors. **Company:** RightSoft. **Requires:** Mac 512K. **List price:** \$95.



Just how good a job can an automated grammar and style checker do? Three companies have introduced programs that are intended to help Macintosh users improve their writing. All three programs claim to find grammatical errors and flag stylistic problems, all deliver a statistical analysis of the text and offer writing tips, all can read plain ASCII (or text) files, and all were previously available in DOS versions. Each, however, takes a slightly different approach.

### Correct Grammar

Correct Grammar for the Macintosh checks the spelling and grammar of documents created on a wide variety of word processors, including Word 4.0, MacWrite II, and WordPerfect. When you start the program, a dialog box prompts you to choose which word processing file to open, and the

program immediately begins checking the selected document. Your text is displayed in one window, warnings and advice in another.

A row of buttons between the two windows lets you perform various functions or access more information (see "Correct Grammar Screen"). In many cases you can correct a problem with the click of a button, but you may want to move the cursor to the Edit Window to make additional changes. The text in Correct Grammar's Edit Window appears one paragraph at a time in 12-point Geneva, making it easy to read and edit. You can skip a problem, use the Quiet button to turn off a rule, or get more information about a grammar question by clicking on Tutorial. If you previously checked the appropriate menu options, Correct Grammar automatically saves a backup copy of your original document and produces a readability analysis of your text. You can customize Correct Grammar by turning off and on grammar and style rules and by changing the readability parameters.

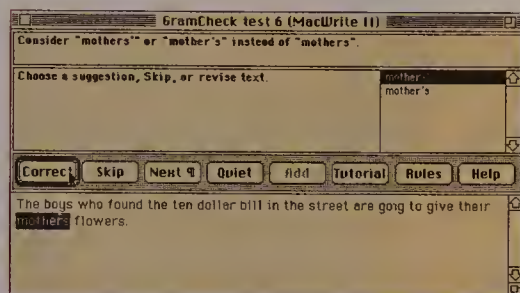
Correct Grammar claims to be 95 percent accurate, but I found that figure to be misleading. I used all three programs on text that was doctored for an editing course—an admittedly tough test—and on a half page of simple ungrammatical sentences. Correct Grammar identified some of the trickier problems that the other programs missed, but it ignored plenty of others and suggested "corrections" that would have made sentences incorrect. For example, it flagged the noun *aide* in the appropriate context, suggesting that the verb *aid* was needed, but ignored *aid* used improperly. It also flagged several subject-verb agreement problems when the words were neither subjects nor verbs.

### Grammatik

Grammatik Mac, which supports a shorter list of word processors, uses bundled utilities to convert files into a form it can read. (The new version will offer a much wider variety of word processors.) Like Correct Grammar, Grammatik can be customized for different writing styles, and specific rules can be turned off. You start the program by clicking on the icon for a preference file that you have set up with

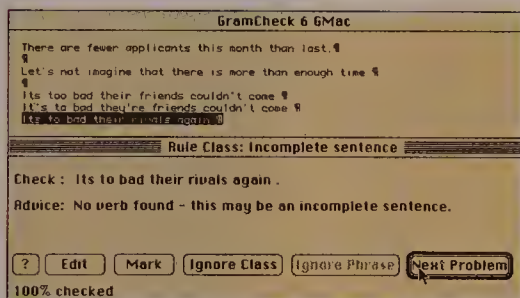
the options you want, including word processor format and appropriate writing style for your intended audience. On-screen buttons prompt you to open a file and designate a different file name for saving the revised text.

Grammatik offers several methods for copy editing (referred to throughout as proofreading). You can examine grammar, style, and spelling interactively, or you can produce marked-up copy, with or without explanatory notes added to the text, and (continues)



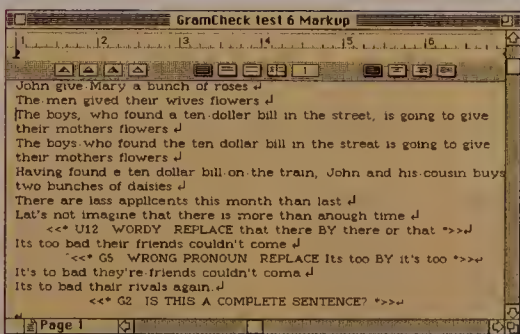
### Correct Grammar Screen

Correct Grammar identified a verb agreement problem in this sentence and suggested changing *is* to *are*. The program does not seem to recognize indirect objects. Here, it prompts the user to make the indirect object *mother* possessive.



### Grammatik Screen

Grammatik correctly suggested changing *less* to *fewer* in the top sentence. The program recognizes that something is not right with the bottom sentence, but it found no errors in the two preceding sentences.



### RightWriter Marked-Up Copy

RightWriter missed most of the errors in these sentences, displayed in MacWrite II. When you are finished editing, you can go back to RightWriter and have it delete all of its comments from the document.



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return to your word processor to edit or print it. In the interactive mode, text is displayed in the upper window and advice and function buttons in the lower window (see "Grammatik Screen"). With some problems, you have the option of replacing a word or phrase with one suggested by the program. You can also ignore a phrase or class of problem for the rest of the session or skip to the next problem. A question button takes you to the program's grammar and style rules.

You can also activate the Edit Window and make your own changes. The program provides access to about two half-screen windows of text in the 9-point Monaco font, which can be murder on the eyes and difficult to highlight precisely with the I-beam cursor. When the session is finished, Grammatik displays a readability analysis that includes charts comparing your text to three standard works.

Whether or not Grammatik manages to catch complex problems, such as verb agreement, depends on the construction of the sentence. It identified the error in the sentence "The boys, who found a ten dollar bill in the street, is buying their mothers flowers." But take away the commas to make the *who* clause restrictive, and Grammatik sees no error. Also, the program sometimes recognizes that *its* or *it's* has been used incorrectly, but other times it lets the mistake slide.

### RightWriter

RightWriter is a noninteractive program that produces a marked-up copy of your text. The comments that intersperse the marked-up text are coded (see "RightWriter Marked-Up Copy"), and if you want more of an explanation you can look up the code in the manual. Following the marked-up text is a readability analysis that features a list of words that may be problematic, for example, sexist language, possible jargon, and negative vocabulary. *Accident*, *demanding*, *protest*, and *fault* are only a few of the many words that the program flags as negative. Fortunately, RightWriter's dictionary, the list of words the program will flag and identify as problems, can be modified, but the process involves importing lists of words from a text file. When it came to spotting actual grammatical errors,

RightWriter was the weakest of the three programs.

### Which, If Any, to Buy?

As style checkers, these and similar programs can be useful for pointing out weaknesses in your writing, such as too much use of the passive voice or too many long sentences. As grammar checkers they can help you catch some errors, but you have to wade through repetitive warnings, look for the problems the program missed, and know enough about grammar to identify erroneous corrections. If you can live with the shortcomings inherent in the current generation of Macintosh grammar checkers, consider the features that distinguish one program from another.

Interactive editing is easier with Correct Grammar, which offers larger print, the ability to work forward as well as backward in each paragraph, and the chance to go back and check any changes you've made in a sentence. Grammatik offers more flexibility for people who want the choice of editing interactively within the program, or in their word processor, or on paper. RightWriter requires only 512K of memory, and the all-caps advice that it inserts into the text is easier to find than Grammatik's mostly lowercase notes. —Gerry Lukos

See Where to Buy or circle 748 (Grammatik Mac), 842 (RightWriter for the Mac) on reader service card.

## ★ Button-Creation Software

### ICON-IT 2.0

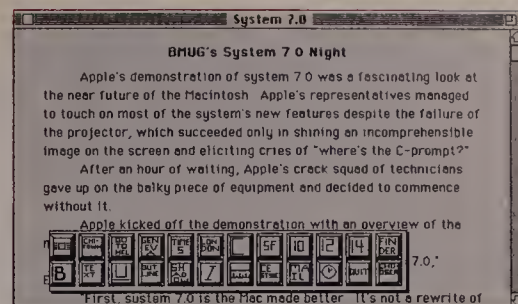
**Pros:** Easy to customize appearance and function of icons; works well with macros; offers wide range of prefab icon bars.

**Cons:** Creates barrier on the screen; shape of icon bars limited; lacks drawing tools.

**Company:** Tactic Software. **Requires:** Mac 512K. **List price:** Version 2.1 \$89.



If you'd like to customize your Mac's interface but are unwilling to brave the complexities and hazards of ResEdit, you may find that Icon-It 2.0 (formerly published by Olduvai) can create functional icons much more easily. For instance, this INIT can overlay icons with functions onto applications—unlike ResEdit,



### My-cons

My icon bar for Word 4.0 includes many font and style commands as well as access to DAs and macros.

which requires programming to add icons with functions to applications. However, Icon-It's icons have some idiosyncrasies that leave their own stamp on the Macintosh interface.

### Icon Buttons

Icon-It's icons are really buttons that appear on screen either solo or as a part of an icon bar. You can create your own bar of icons and customize each icon's function and appearance, or you can take advantage of preset, application-specific functions found in the more than 100 templates that come with the program.

Selecting Icon-It from the Apple menu makes the Icon Bar editor appear. With the Icon Bar editor you can open up one of the templates and install or remove a bar. Once you've selected a bar, you can use the editor to set its shape and position, and to orient it vertically or horizontally.

Version 2.0 adds the handy ability to create vertical icon bars, but they are still limited to a rectangle shape instead of shapes that would be more useful on a small screen—such as a pattern that would fit into a corner.

One idiosyncrasy is that if you drag a window over an icon bar, the window disappears where the icon bar and the window overlap. The unlucky window that gets its title bar or close box dragged behind an icon bar can only be moved or closed by holding down the Option key as you click or drag.

The functions provided by the icon-bar templates are mostly menu commands. For instance, the Full Template for Microsoft Word 4.0 includes buttons for saving, printing, getting a ruler, and quitting. While these functions may save a few steps, (continues)



the inconvenience of having a wall of buttons covering a large portion of your screen may make you want to go back to doing it the old-fashioned way.

### Customizing

Icon-It becomes more useful when you begin customizing bars and icons. For instance, if you often change between fonts and styles, you will find Icon-It's on-screen buttons easier to use than menus or command keys. Customizing icons to perform a single menu command is as easy as opening up the Icon Function editor and selecting that function from a menu. Once you have assigned a function to an icon, you can use the Icon Function editor to doctor its appearance. While this editor lacks some tools that might be useful (invert, graphics rotation, text entry, and marquee) its FatBits canvas is adequate for creating small images quickly. In addition, images for icons can be pasted in from paint programs (though getting the icon images to be the correct size is a bit tricky).

### Creating Icons from Scratch

Just as customizing buttons for specific functions makes Icon-It more useful, creating icon bars from scratch makes it more convenient. When you start with a blank icon bar you can set the height and width of your buttons, so you can reduce them to a very small size and make the icon bar less of an obstacle on screen.

Icon-It is especially useful when used to activate macros. With buttons that indicate the function of the macro being activated, even the most complex macro can be made intuitive and simple. Icon-It can activate Tempo, QuicKeys, MacroMaker, Excel, and Automac III macros.

Unfortunately, the new online help system adds little to Icon-It's rather skimpy user manual, providing only a short description of the functions of the buttons and fields in the Icon Bar editor and the Icon Function editor.

But overall, despite its quirks and inconveniences, Icon-It will probably be a permanent addition to my Finder and to my favorite applications. And it certainly is a stepping stone along the way to ultimate customization.

—Jonathan Cassell

See Where to Buy or circle 780 on reader service card.

★  
Puzzle Game

## JIGSAW 1.0

**Pros:** Many levels of play available; makes new puzzles from imported paint and PICT files. **Cons:** No interesting puzzle-piece shapes; gray-scale graphics are fairly dull.

**Company:** Britannica Software.

**Requires:** Mac 512K. **List price:** \$39.95.



Sure, we all know the Mac is a tool not a toy, and yet one of the things that Mac programmers are particularly good at is devising games. There are by now countless ways to divert yourself from that project budget you were plugging in to a spreadsheet, the sales presentation you were outlining, or the article you were writing—without ever moving from your computer. Certain games, like Tetris or Pipe Dream or Klondike, are addictive pastimes—games you can play while chatting on the phone or while someone's got you on interminable hold. Jigsaw is definitely this type of game. And like others of its type, its simplicity is deceptive.

### Child's Play

The basic play couldn't be simpler. Jigsaw is perhaps a misappellation; each puzzle is composed of uniformly sized rectangular tiles—8, 15, 40, or 60 pieces, depending on the selected level of difficulty. You click on the piece you want to move, highlighting it, and then click on the one occupying the spot where you want to place the first

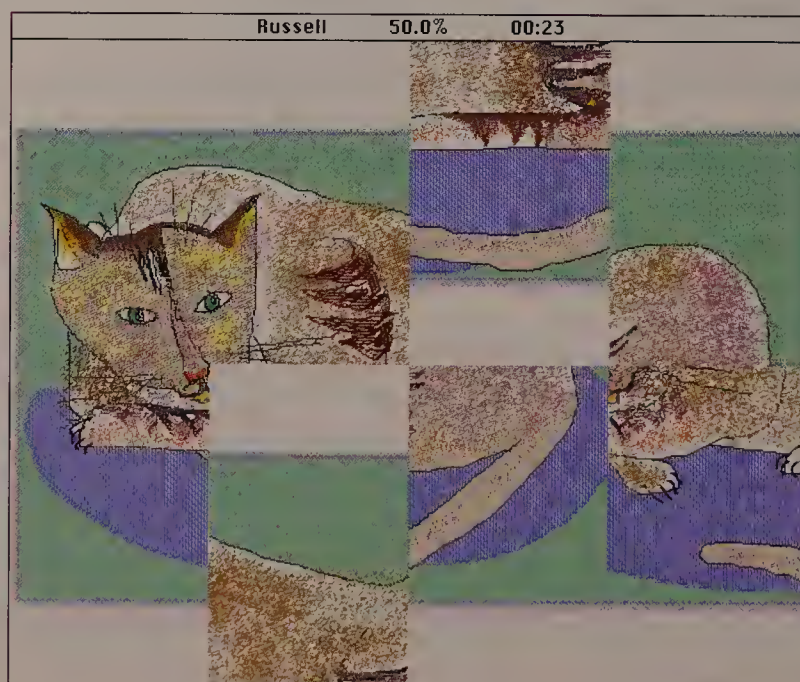
piece; the program instantly switches the positions of the two pieces. A clock keeps track of your playing time. When all the pieces are correctly assembled, the clock stops and your score appears in a pop-up window along with other time records for that challenge level.

In addition to letting you choose the number of pieces, Jigsaw offers several other options for adjusting the degree of difficulty. In standard operation, you can study the puzzle picture as long as you like before clicking the mouse button to scramble the pieces and start the timer. You can also sneak a peek at the picture during play if you need to refresh your memory, although Jigsaw penalizes you each time by adding ten seconds to your score. If you check Hard Way in the Goodies menu, the puzzle appears on screen already scrambled, with the clock running. Hard way also disables the Show Picture option, so you've either got to tough it out or give up. If you quit before finishing, Jigsaw lets you save the puzzle so you can come back to it later. (If you want to look busy for a minute, you can choose Hide window, and the timer waits until you decide it's safe to switch back to Show window.)

### Give Me a Hint

The program also comments on your progress as you play. If you make a good move, Jigsaw signals with whatever sound you have set in the Control Panel; otherwise it remains silently noncommittal. This can be a little confusing, since an unrewarded move is

(continues)



### P Is for Puzzle

This portrait of a favorite family friend makes an entertaining puzzle for children when divided into 8 easy pieces. But grown-ups should not be fooled—set for 60 pieces and no audio clues, this puzzle could take you the better part of an hour to solve.



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## STORAGE DIMENSIONS





### **A Rose by Any Other Name**

**Selecting Hard way (no hints and no peeking) from the Goodies menu and 40 pieces under Level should provide more than enough challenge for most puzzle enthusiasts.**

not necessarily a mistake. You can turn the sound off if you prefer to do without Jigsaw's kibitzing. There's also a small window at the top of the screen that keeps constant track of the percentage of the puzzle you've completed correctly, sort of the way children say "warmer . . . warmer."

Jigsaw comes with eight gray-scale images and three color images plus the ability to import your own. Some of the puzzles are clearly meant for children—an illustrated ABC and three *Wizard of Oz* characters, for example. The rest are a grab bag—an American flag, a butterfly, a landscape, and so on—suitable for any age player, but not especially engaging. The color images are more appealing, but without a color monitor the difference is academic. Color also makes the puzzles easier to complete. Just try out the impressionistic bathing scene (which, curiously, comes in gray scale only). Even with audio hints and only 8 pieces it's tough; choose 40 or 60 pieces and—well, you've got to have more patience than I do. The colorful rose and freckle-faced red-haired child are more rewarding (see "A Rose by Any Other Name").

Jigsaw has a couple of annoying quirks. For one, my copy of the program crashed a few times when closing a completed puzzle and moving quickly to open a new one. A more perplexing problem is that with imported images, the percent-completed display sometimes seems not to acknowledge a finished picture, which of course means the clock stays on, running up the score. The problem turns out to be that the white space surrounding the picture is also scrambled, although invisibly. That's

not such a big deal if you're working with eight pieces; with more it's an existential nightmare. Pending a solution from Britannica, the easiest way around this problem is to surround your picture with patterned borders that fill the frame. Finally, a minor point: if a puzzle is already on screen, even if you have not yet begun to play, you can't switch to another level of difficulty. It would be nice if you could change the number of pieces without having to exit a puzzle and reopen it.

### **Do It Yourself**

When you tire of the supplied images, you can easily import MacPaint, PICT, and PICT2 format pictures to make your own puzzles, simply by copying them to the Clipboard and opening them as New files. This adds value to the \$39.95 game, because the program itself, even with its adjustable difficulty level, can get stale. If you've got a library of pictures you like or the artistic talent to produce your own, Jigsaw can be an economical and creative tool that offers a pleasant diversion (see "P Is for Puzzle").—**Marjorie Baer**

*See Where to Buy or circle 782 on reader service card.*

## **Musical Notation Software**

### **ENCORE 1.2.1**

**Pros:** Transcribes real-time MIDI input; speedy operation on low-end Macs; flexible and simple page-layout controls; sequencer-like MIDI functions.

**Cons:** Output is relatively primitive; expensive. **Company:** Passport Designs.

**Requires:** Mac Plus; System 6.0.2; MIDI instruments and interface; Adobe Sonata Font for PostScript printing. Hard disk recommended.

**List price:** Version 1.2.9 \$595.



Passport Designs' new Encore notation package enters a market already crowded with competition. Positioned as a composer's tool (and as the ultimate accessory for a sequencing package), Encore notates musical input from MIDI instruments and from other programs. The procedure for laying out a score is easy and flexible, and the MIDI side of the program is the best of any notation package I've seen. On the downside, how-

ever, Encore comes with a hefty price tag and a couple of persistent bugs.

Encore's strength is that its overall design and operation are very similar to Pro 4's, Passport's tried-and-true sequencing program. Both packages have similar windows for setting up tracks, and many of the MIDI functions and editing commands are nearly identical. Both programs use a simple set of three cursors (the arrow, pencil, and eraser) to accomplish selecting, entering, and deleting data with the mouse, but Encore displays the musical data in note form, while Pro 4 uses a piano-roll graphic display.

By borrowing so heavily from the strengths of Pro 4, Passport has endowed Encore with a clean, easy-to-understand design, as well as the most functional sequencer ever to appear in a notation program. While it's never going to replace a conventional sequencer, Encore allows you to tweak a score's underlying note data with sequencer-like editing commands. Its capabilities lie somewhere between professional sequencers and other notation programs that support MIDI.

### **Simple Import**

Notes can be imported from Pro 4 or standard MIDI files, can be recorded in real time via MIDI, or can be input by using the Mac keyboard to select note durations and using the mouse to specify placement. Encore lets you create, import, and edit a tempo map, so that you can record a performance over a changing set of tempos; but unlike some of the competition Encore doesn't let you tap a foot switch to control tempo as you're recording. However, entry is usually speedy, since the program doesn't check durations or beam groups of notes as they're input; you must select a region with the arrow cursor and perform the Guess Durations and Beam on Beat commands to see something that resembles correct notation.

Despite Encore's functional track sheet and input filters, real-time recordings are often transcribed raggedly, and the program's simple quantization controls don't completely cure the problem. The best method of real-time input seems to be to use a sequencing program to record and edit the data (*continues*)



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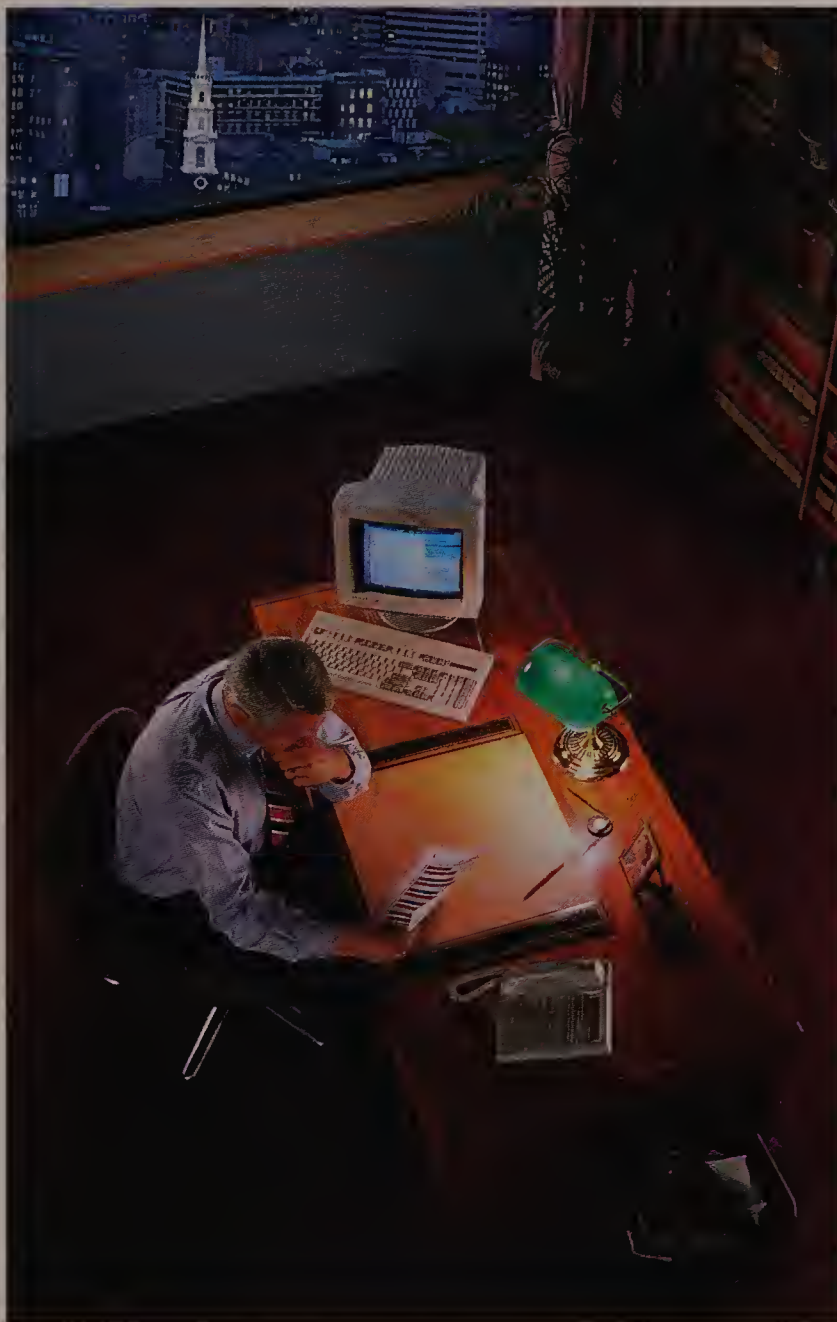
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before importing it into Encore. I got good results by quantizing note attacks and releases and otherwise cleaning up my performances before letting Encore chew on them; with a little outside help, Encore's guessing routines fare a lot better than they do on music played directly into Encore.

You enter symbols, lyrics, and ornaments by choosing them from palettes and clicking on the desired location, although the default placement for some symbols is not very useful. Many notation programs operate like drawing programs; Encore does not. It provides no way to magnify the view, click on an object to make its handles appear, or move and resize objects. A program in this price range should at least have a Zoom command.

Encore's simple layout commands let you quickly set up systems of up to 64 staves, with fully controllable bracketing and bar lines. Menu commands let you set the number of measures and systems displayed on any page, and page icons at the top of the screen allow you to move quickly to any page. Any range of notes can have one of four alternate note heads. You can display and print any staff at one of four sizes, or you can hide a staff on specified pages. Simple and flexible measure numbering and fields for title, header, footer, and copyright notice on each page round out the program's basic yet sufficient set of layout tools.

### A Problem of Positioning

Some of Encore's best-executed features are the ones that few notation programs have, like a command for creating crescendos that play back by ramping up note velocities across a

region, or a command that sets note durations to play back at a percentage of their on-screen value. With a little manipulation, you can create a fairly decent sequence using Encore, so that even without a separate sequencer the program provides fairly listenable playback for proofing purposes. But given the problems with real-time transcriptions, I think it unlikely that Encore will be used as a stand-alone solution to a composer's needs.

Anybody who needs Encore's transcription functions as well as its ability to record and play back (but not edit) MIDI data would be much better off using a simple \$100 sequencer that can export MIDI files (such as Passport Designs' Master Tracks Jr. or Opcode Systems' EZ Vision) as an input module for Encore. This brings up the big question: if you're going to use another program for input, why use a notation program that has MIDI input functions? Why not use a simpler, drawing-style program for transcribing and editing the scores?

I've had the best results so far using Coda's MusicProse (which has limited MIDI capabilities, but can follow live tempos via a foot switch) to edit and print files created in a sequencing program (see *Reviews*, *Macworld*, April 1990).

Encore's main problem is market positioning. It handles 64 staves and it transcribes real-time performances, so it's positioned as a high-end product. Given Encore's simple layout and lack of drawing-style tools, it's probably best suited to MIDI musicians who need to print horn charts and lead sheets, of reasonable—if not of publishable quality—with a minimum of hassle. In this

situation, Encore performs excellently—for a program at, say, \$295. At \$595 it doesn't look any better than the competition.—**Charles Clouser**

See Where to Buy or circle 739 on reader service card.



### Color Paint Program

## EASY COLOR PAINT 1.1

**Pros:** Full 256-color support; standard MacPaint-like paint tools with enhanced functionality; variable document size; good speed; extremely low price; runs in black and white on Mac Plus; compatible with 32-bit QuickDraw. **Cons:** Relatively few special effects; no color-separating capability. **Company:** Creative Software. **Requires:** Mac Plus, Mac II and System 6.0.2 or later for color operation. **List price:** \$79.



Mac II owners may have faster computers with dazzling color displays, but they lack something every buyer of a Mac 128K took for granted—basic painting software.

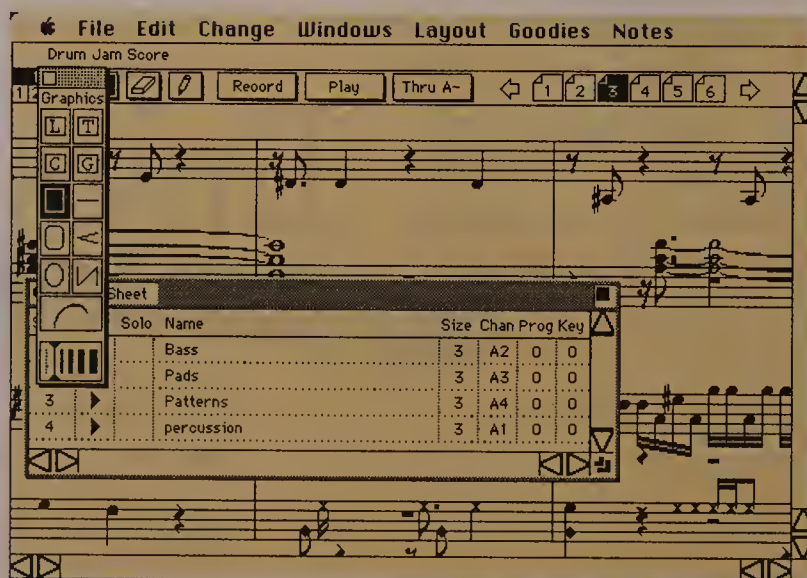
Enter Easy Color Paint, the MacPaint for the color age. Concentrating on simplicity, economy, and fun, Easy Color Paint extends the painting fundamentals originated by Apple's first graphics program to the realm of color computing. But Easy Color Paint doesn't stop there. Though it avoids bells-and-whistles excess, Easy Color Paint improves on MacPaint with numerous additions and refinements, even a few special effects. The result is a satisfyingly strong yet incredibly inexpensive color paint program that casual computer artists—and their kids—will enjoy for hours on end.

Easy Color Paint takes full advantage of the standard Mac II's 8-bit color mode, meaning that you have access to 256 separate colors in each piece of art (if you want to save memory or if you have a less-capable computer, you can choose black-and-white, 4-color, or 16-color modes instead). Yet aside from a few variations in screen layout, the Easy Color Paint working environment is faithful to the archetype established long ago by MacPaint (see "Artist's Tools"). The painting tools now occupy a rectangular window instead of a vertical palette, but you'll

(continues)

### Beamed on Beat

This file was imported from a sequencer with note attacks and durations already quantized to 16th notes. Encore then guessed at the note durations and beamed them on the beat. The Track Sheet window, under the tool palette, shows the MIDI parameters for each staff.





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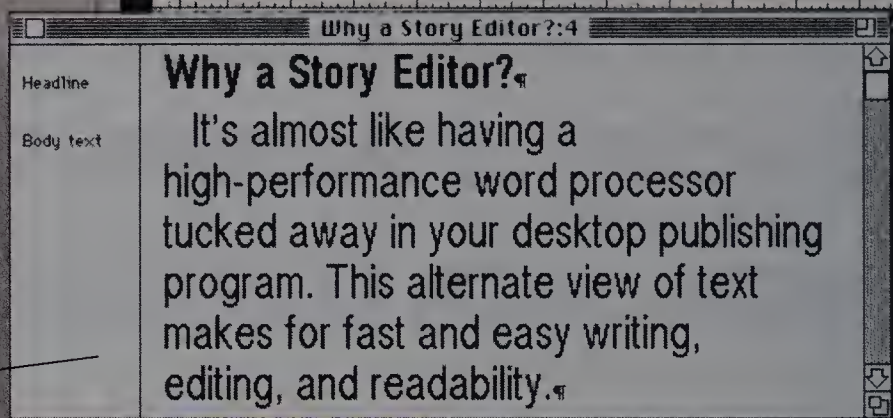
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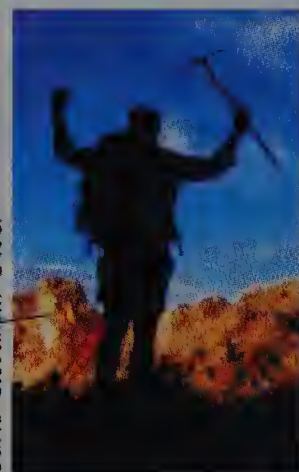
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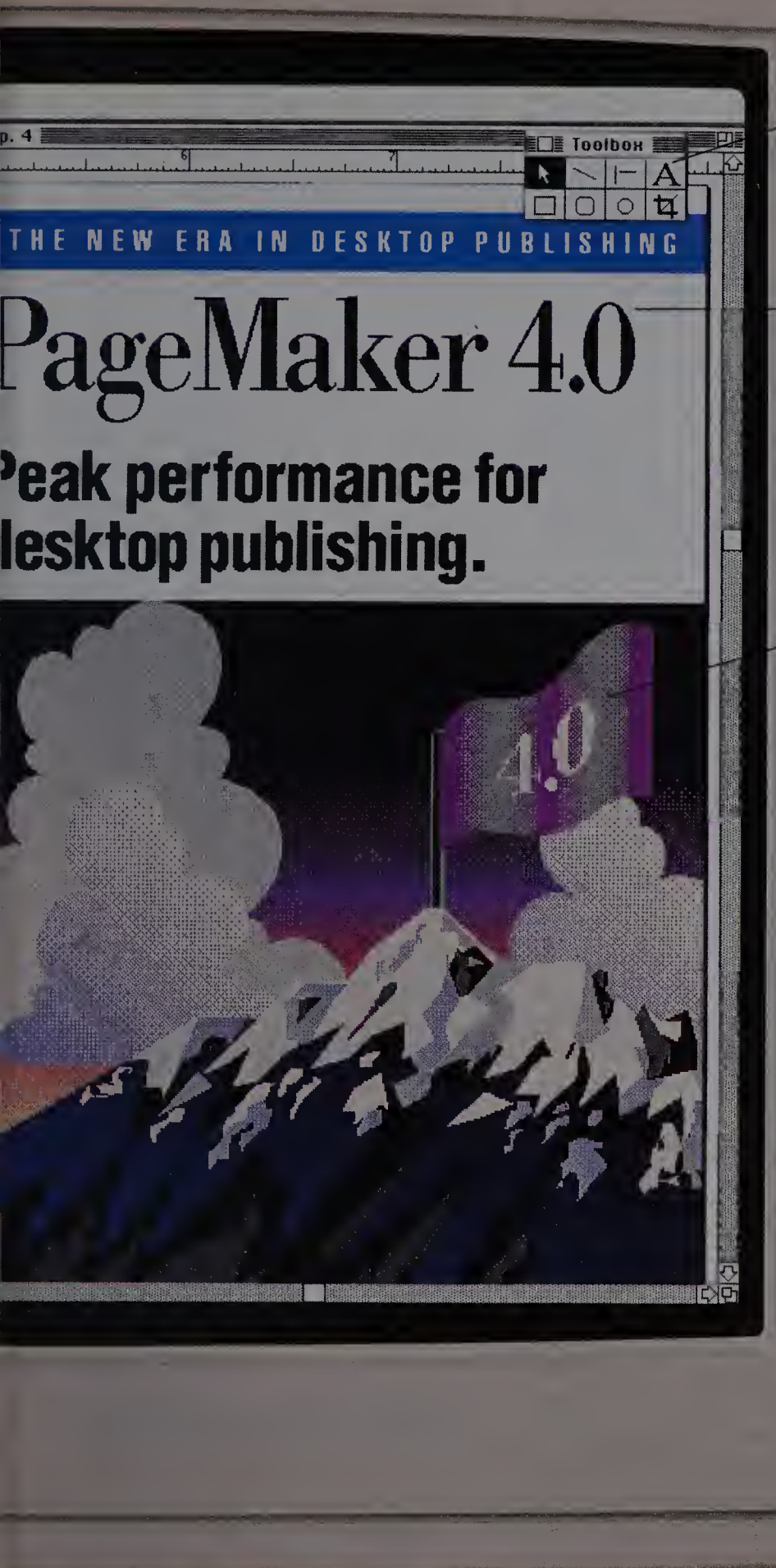
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### Artist's Tools

**Easy Color Paint** extends the painting fundamentals originated by Apple's first graphics program to the realm of color computing. It also runs in black and white on a Mac Plus.



immediately recognize most of the icons. Another window contains a familiar smorgasbord of bitmap patterns. There is one obvious addition to the screen, however: the large palette from which you select foreground and background colors for your artwork.

### Basic Color Painting

At its most basic, color painting with Easy Color Paint is as straightforward as painting in black and white with MacPaint, and it's even more fun. Pick a color and pattern, choose a tool, and start painting—if you like MacPaint, you'll be spellbound when you see what intense stabs of red or peaceful pastel washes add to your artwork. The program is fast and responsive, even with all those colors to keep track of, and it functions flawlessly. All of the traditional painting tools (paintbrush, spray can, paint bucket, pencil, and so on) work just as you'd expect.

Easy Color Paint offers a healthy set of enhancements, some of them having to do with color per se, some representing improvements on the fundamental painting tools. In the color department, your first advanced choice is which of six 256-color palettes you want to paint with (my favorite is Winter Forest, a selection of icy grays, blues, and pinks). You can also decide how the colors on the electronic brush get applied to the screen. In the standard method, the new colors obliterate whatever was there before. Five other options combine what's on the brush with the colors it passes over in various ways for a broad range of useful effects. There's even something called wacky color rotation, which automatically switches to new foreground and background colors

several times a second. Like PixelPaint and Studio/8, Easy Color Paint comes with an eyedropper tool. This tool lets you switch to a color that's already on the screen; you don't have to find it on the palette.

### MacPaint Extended

Color aside, Easy Color Paint's biggest accomplishment is the way it extends the capabilities of the basic MacPaint tools without sacrificing simplicity. As in PixelPaint, nearly every tool has a menu of its own, but these only appear when that particular tool is active. In the Brush menu, for example, you can choose the size of the brush over a wider range than MacPaint permits and select from a long list of brush shapes. Likewise, the Eraser menu lets you choose the size of the eraser—a welcome improvement over MacPaint—and also lets you determine whether the erased areas are filled with white or the background color. The Marquee (sic) menu allows you to select a rectangular, circular, or oval shape for the marquee, it also lets you specify how a marquee is defined with the mouse (by dragging from one corner to the opposite corner, by dragging out from the center, and so on).

Since Easy Color Paint stores its files in PICT format, you'll have no trouble exchanging files with most other Mac graphics applications. The program can also open MacPaint files and accept pasted images from the Clipboard. Ordinarily, Easy Color Paint paintings are sized to match either the standard MacPaint document or a full Mac II screen, but the program lets you define a custom size and will also adjust automatically to match any PICT document you read in. Although the

manual is clear, it spans just 32 pages, lacks illustrations, and neglects coverage of special option and ⌘-key tricks. But that hardly matters, since this modestly named program sports a surprisingly complete help system.

### Not the Final Word

Easy Color Paint doesn't claim to be the final word in color paint programs, so it's not surprising that some fancy features are missing. As in MacPaint, you get only one magnified view size for FatBits editing, and there's no grid for precision positioning. While you can rotate an entire painting or a selected region in 90-degree increments, free rotation isn't permitted. Nor does the program let you alter selected areas with perspective, skewing, or distortion effects. I particularly miss the brush mirrors feature—color kaleidoscopes would be a lot of fun. But probably the most serious drawback for professional illustrators is that this program can't do color separations (but Easy Color Paint does print to Mac-compatible color printers).

Easy Color Paint won't replace high-end, high-priced color paint programs, and serious artists should look elsewhere. But if you'd be happy with a color paint program that has the low price, solid performance, and good-natured appeal of MacPaint, buy Easy Color Paint—it's even better, and it's less expensive. —**Steve Cummings**

See Where to Buy or circle 737 on reader service card.



### Infrared Connectors for LocalTalk

## PHOTOLINK

**Pros:** Easy to reconfigure networks; easy to set up; can be used in almost any environment. **Cons:** None.

**Company:** Photonics Corporation.

**Requires:** LocalTalk or equivalent connectors from Mac to Photolink. **List price:** \$1195.



What looks a bit like ET, sits atop your cubicle, and keeps you connected to the file server? It's Photolink. And it could certainly change the way office networks are connected. Rather than depend completely on Apple's LocalTalk cables (continues)





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**Photolink from Photonics**

or unshielded twisted-pair wires (PhoneNet and its derivatives), the Photolink uses infrared light to create a network.

### Point and Connect

The Photolink is an AppleTalk replacement for network cables. There's no software to install; you connect the Mac to the Photolink with the LocalTalk cabling. Attach a minimum of two Photolinks to something sturdy (like a cubicle wall), aim them at a common spot, and a network is born.

That's all there is to setting up the Photolinks; it is difficult to believe, but it really is that simple. Each Photolink comes with its own power supply and four RJ-11 sockets to connect the Macs and peripheral devices to the Photolink network. The Photolink bracket contains much of the electronics and includes a C-clamp for anchoring the Photolink to the top of a cubicle divider. Photonics also provides two pieces of Velcro for attaching the Photolink to a wall.

Once the Photolinks are anchored, you select an area on a wall or ceiling where all the infrared beams can intersect to exchange data. Point one Photolink at the desired spot and turn it on. Turn the next Photolink on, and aim it at roughly the same spot. A green light on the back of the unit blinks slowly and then more rapidly as the signal received from the other Photolink increases in strength. Pick the Photolink orientation that gives the most rapid blinking and you're all set.

### Setup Rules

The Photolink is versatile. You can point from 2 to 32 units at the same spot to exchange networked data. All the Photolinks should be located within 35 feet of the target spot in a typical office environment (9-foot ceilings with 5-foot-high partitions). If you have higher ceilings, you can extend the range of the Photolinks. At the San Jose Convention Center in San Jose, California, two Photolinks at opposite ends of the meeting hall (more than 500 feet apart) were able to form a network by targeting an area on the ceiling 50 feet above the floor.

The Photolink's infrared beam doesn't work well with highly reflective surfaces; it requires a diffuse reflection of the signal from another Photolink (surfaces like acoustical ceiling tiles and regular walls work just fine as target areas). On the other hand, because the Photolink uses an infrared wavelength that is just outside the normal range of visible light, you can use ordinary mirrors to reflect a Photolink's beam around corners to connect to other rooms. Transmitting the infrared beam through an interior window (between an office and the hallway) also had no adverse effect on the Photolink's performance.

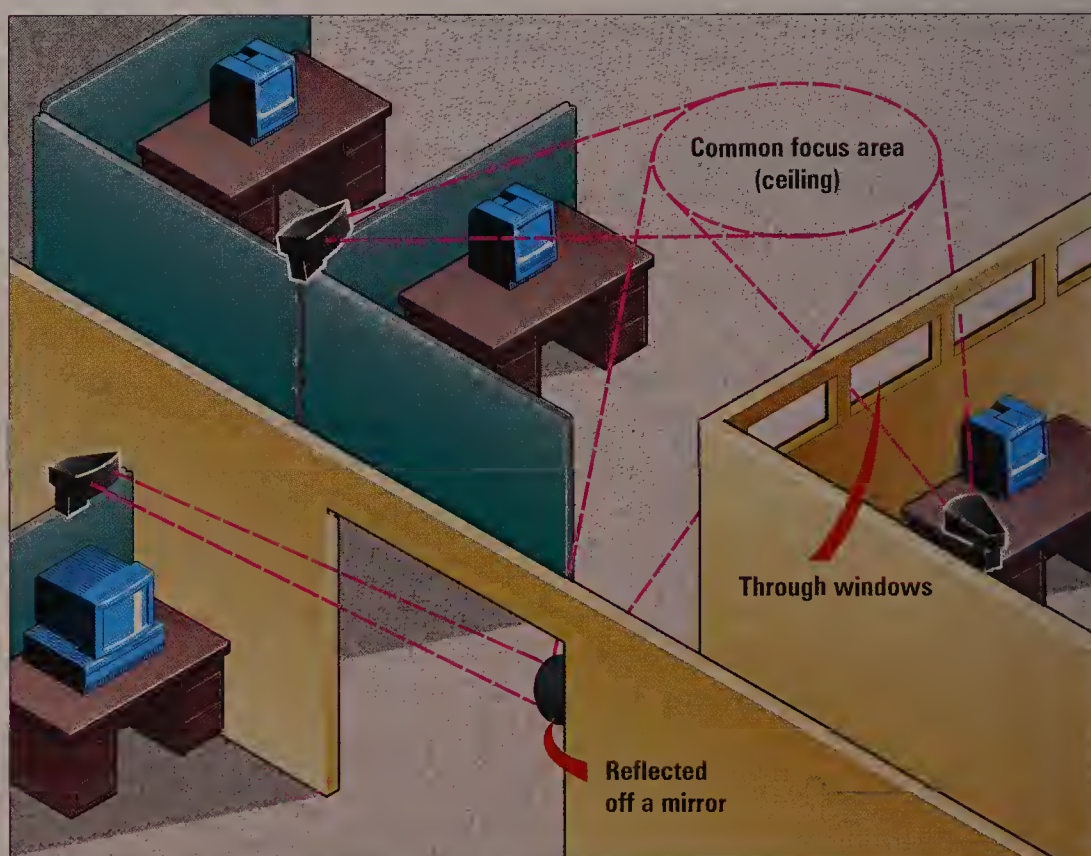
Each Photolink has four network ports. If you're using Apple's LocalTalk cabling, you can connect one de-

vice per port, according to Photonics. The company also suggests daisy-chaining a maximum of two devices per port if you're using PhoneNet wiring. However, I tested the Photolinks with a daisy chain of five devices on one port without problems. In most cases, it's wise to stay away from long daisy chains when designing a network, so Photonics' rules are more an extension of the principles of good network design than a limitation specific to the Photolink.

### Ready, Aim, Network

Networks change: people move; new equipment comes in; cubicles are added or removed. In a cabled network these changes might require rewiring. This can take days to accomplish. Photolinks offer a much easier, simpler form of networking while playing musical cubicles. Regular wiring schemes such as LocalTalk and PhoneNet are good for established networks that don't change much, but Photolink is a good choice for large offices where cubicles or offices change location and require frequent rewiring. At a price of \$150 per device (two devices per port for a total of eight devices per Photolink), the Photolink is also a cost-effective solution to rewiring a network; it'll probably pay for itself after the first reorganization.—**Dave Kosiur**

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**One possible Photolink configuration**



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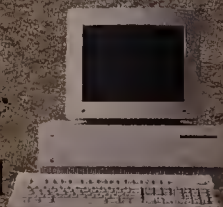
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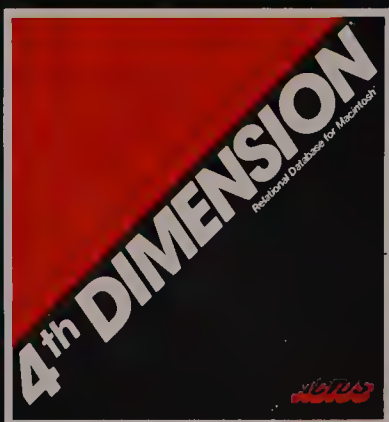
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Professional MIDI Interfaces

## MIDI TIME PIECE

**Pros:** Eight independent MIDI inputs and outputs provide up to 128 MIDI channels; can attach to three additional MIDI Time Pieces to accommodate extremely large MIDI networks; desk accessory provides versatile routing and filtering options for MIDI data; synchronizes reliably; excellent manual.

**Cons:** Uses external power adapter.

**Company:** Mark of the Unicorn.

**Requires:** Mac Plus. **List price:** \$495.

## STUDIO 3

**Pros:** Accepts optional foot switches for real-time control of certain MIDI data; provides rear-panel modem and printer ports; synchronizes reliably.

**Cons:** Only two MIDI inputs; minimal MIDI routing options; weak documentation.

**Company:** Opcode Systems.

**Requires:** Mac Plus. **List price:** \$379.



The musical instrument digital interface (MIDI) lets you connect one or more electronic instruments to a computer. Once that's done you can use sequencing software to create multipart arrangements and use editing software to alter and manage the instruments' sounds (see "Getting Started with MIDI," *Macworld*, August 1990).

But before you can create a silicon symphony on a Mac, you need the interface itself—a box that connects MIDI instruments to the Mac's modem or printer port. For simple MIDI setups, consider one of the low-cost (\$100 to \$200) MIDI interfaces available from Apple, Opcode Systems, Passport Designs, or J. L. Cooper Electronics. If you want to connect more than three instruments to the Mac—or if you need to synchronize sequencer software to external devices—you'll want a more sophisticated MIDI interface, such as Mark of the Unicorn's MIDI Time Piece (MTP) or Opcode Systems' Studio 3.

These high-end devices provide several MIDI In and one MIDI Out connector. This lets you create large MIDI networks without daisy-chaining (connecting one instrument's output

to another instrument's input), which can lead to delays in MIDI data transmission when numerous MIDI devices are interconnected.

Both the MTP and the Studio 3 interfaces also let you synchronize sequencer software with an audio or video tape recorder. The interface can record a synchronizing, or sync, tone, which carries timing information, on one track of an audio or video recording (a process often called striping). When you play back the recorded sync tone, the interface interprets it and generates MIDI Time Code signals that a sequencer program locks on to, thereby ensuring that the sequencer and the audio recorder play back at the same pace.

### Ins and Outs

Both the MTP and the Studio 3 work well and provide similar features, but the MIDI Time Piece takes first place. For starters, it offers 8 MIDI In and 8 MIDI Out connectors; the Studio 3 offers just 2 MIDI Ins and 6 MIDI Outs. The MTP gives you a total of 128 independent MIDI channels—in theory, at least. The MTP's cabling scheme is currently supported by only one sequencer—version 3.4 of Mark of the Unicorn's Performer. If you don't use Performer, the MTP provides 32 independent MIDI channels. Mark of the Unicorn reports that other companies plan to update their software to take advantage of this capability.

You can connect up to four MTPs to provide a whopping 512 MIDI channels. What's more, the cables that interconnect MTPs can be up to 1000 feet long, versus the roughly 50-foot

maximum length for MIDI cabling. That extra 950 feet could be significant if you're wiring an auditorium or large recording studio for MIDI.

Both the MTP and the Studio 3 come in 19-inch cases designed to fit standard equipment racks. To save you from snaking your arm around the back of a rack, the MTP provides one MIDI In and one MIDI Out on the front panel—a nice touch.

Like most MIDI interfaces, both the MTP and the Studio 3 run at a 1MHz clock rate. The MTP, however, also has a fast mode that lets it run faster when connected to a Mac with a 68020 or 68030 processor. The fast mode boosts performance and reduces the chance of timing delays when the Mac is transmitting large amounts of MIDI data.

Inexpensive MIDI interfaces monopolize a Mac's modem or printer port. To use a modem or printer, you must disconnect the MIDI interface and connect the modem or printer. Not so with the MTP and the Studio 3. The MTP provides a second modem port, while the Studio 3 provides a modem and a printer port. Both interfaces let you choose between MIDI and standard serial-port operation by flicking a front-panel switch.

### Sync or Swim

In the sync department, the MTP and Studio 3 provide similar features—both can interpret and generate the industry-standard SMPTE (Society for Motion Picture and Television Engineers) time code, in all four of its formats. Both can also convert incoming

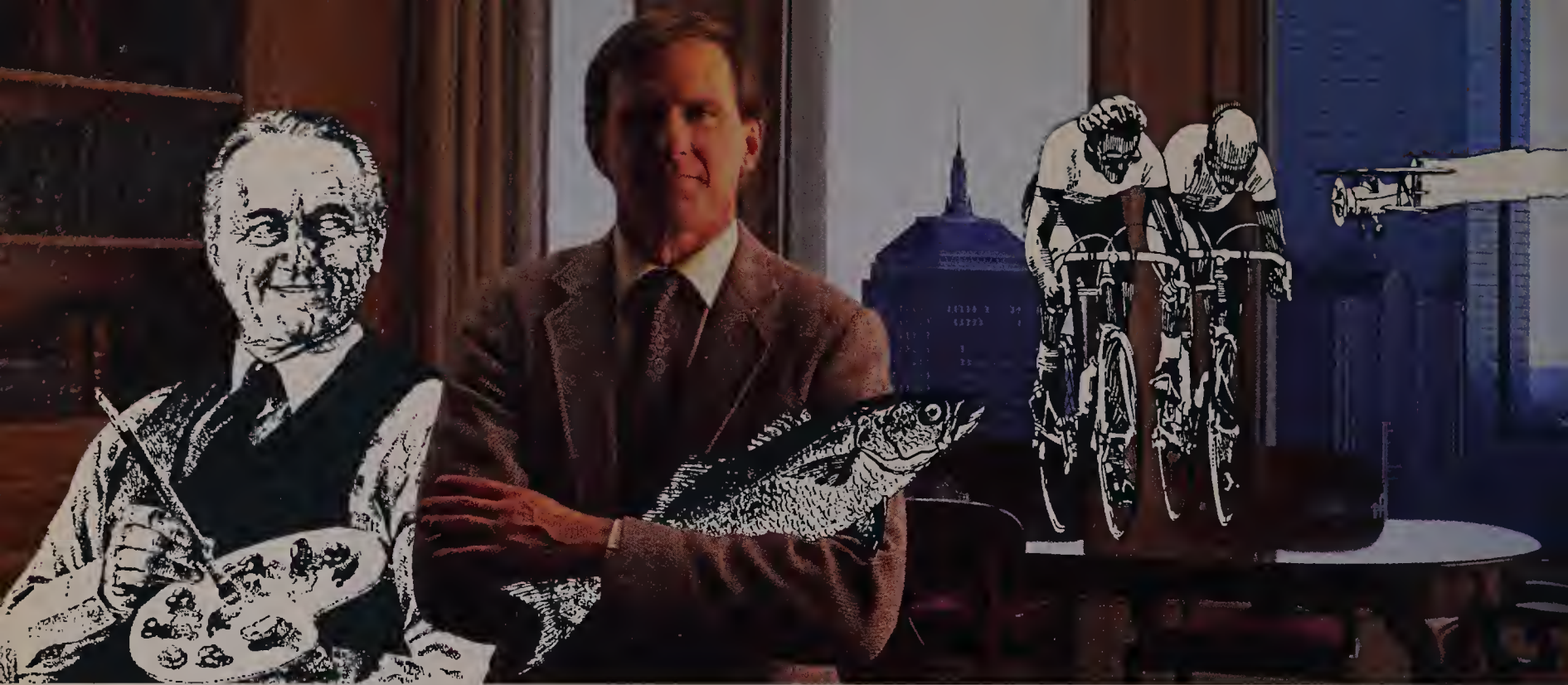
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MARK JOHANN

**MIDI Interfaces**  
The MIDI Time Piece (top) and the Studio 3 both provide sophisticated communication between your Macintosh and three or more MIDI instruments.





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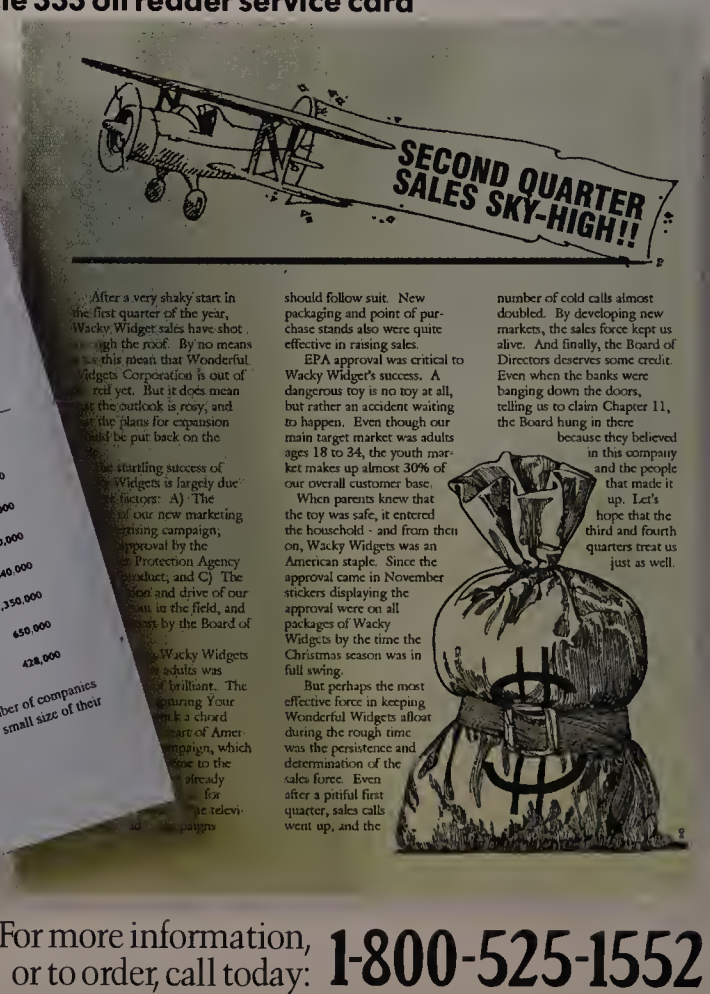
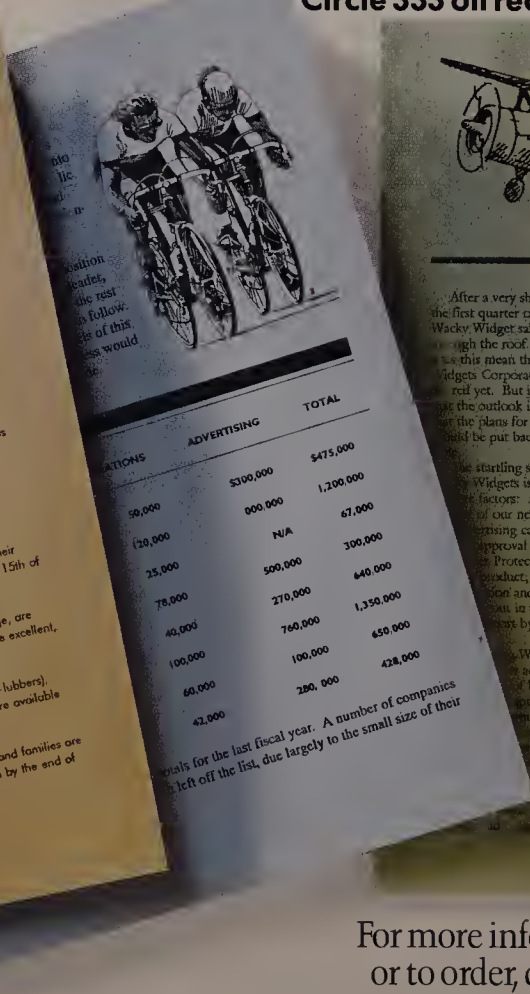
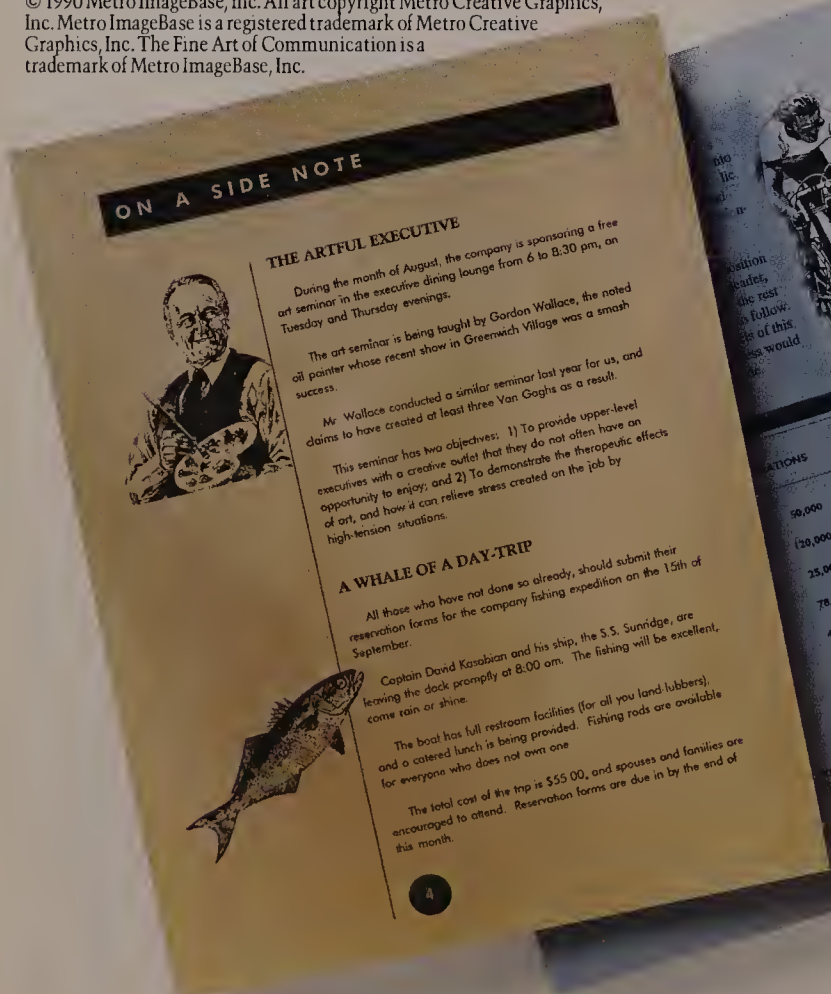
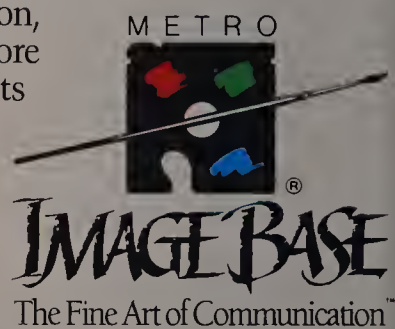
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SMPTE to MIDI Time Code, and both provide *jam syncing*, in which the interface regenerates incoming SMPTE code in real time to avoid a weak sync signal that could result in the loss of synchronization.

Both interfaces provide a desk accessory that allows you to specify sync settings and begin striping a tape. The MTP comes out ahead here, too. Its desk accessory lets you adjust the output volume of the sync tone; the Studio 3's output volume can't be adjusted.

As sync boxes, both the MTC and Studio 3 performed beautifully, tolerating weak or poorly recorded sync tones and occasional dropouts. Both boxes were even able to interpret sync tones recorded on an aged stereo cassette deck whose heads are out of alignment.

### Routing and Muting

Most MIDI interfaces, including the Studio 3, simply act as conduits for MIDI data, shuttling it between the electronic instruments and the Mac. The MTP is more versatile. Its desk accessory lets you change the MIDI channel assignments for each input and output cable, route any input cable to any output cable, and selectively filter certain kinds of incoming or outgoing MIDI data (see "Manipulating MIDI"). These features spare you the

effort of plugging and unplugging MIDI cables and twiddling dials on the MIDI equipment. Best of all, the DA can save a given configuration on disk.

Studio 3's routing options are minimal. You can route each of its MIDI Outs to the Mac's modem or printer port, but you can't rechannel or filter MIDI data. You can save and restore its settings by copying a Studio 3 start-up document to the System Folder, but you can't save several sets of settings and switch between them.

### Choosing an Interface

Although the MTP bests the Studio 3 in several areas, the Studio 3 does have some noteworthy pluses. It accepts up to three foot switches that you can use to generate MIDI data or remotely control a sequencer program. Two of the foot-switch jacks work with on/off foot switches, while the third accepts a continuous-control pedal. Using the latter, you can control a MIDI device's volume or any other setting that uses continuous data.

Another plus for the Studio 3 is its internal power supply; the MTP uses an AC-to-9-volt adapter that seems out of place on a piece of professional MIDI equipment. If I were subjecting an MTP to the rigors of the road, I'd carry along a spare adapter or two.

The sequencer software you use may also influence your choice. The MTP works best with Performer, and the Studio 3's manual contains numerous references to Studio 3 features that will work with future versions of Opcode's Vision. It stands to reason that each company will make its hardware and software work well together, so if you've bought in to one camp already, you may want to stay there. (And incidentally, if you already have a simple MIDI interface and you just need sync features, consider Opcode's \$199 Timecode Machine.)

In the end, however, the MTP's eight MIDI Ins and eight MIDI Outs, its versatile routing, muting, and channeling options, its elegantly designed desk accessory, and its tutorial-laden manual give it the edge. If you can live without the Studio 3's foot-switch options and internal power supply, the MTP is the better buy.—**Jim Heid**

See Where to Buy or circle 816 (MIDI Time Piece), 849 (Studio 3) on reader service card.

### Business Accounting Program

## ACCOUNTANT, INC. PROFESSIONAL 1.03

**Pros:** Highly competent; menu-driven; includes both Inventory and Payroll segments; good supporting documentation.

**Cons:** Does not make optimum use of Mac interface; annual payroll-tax updates must be purchased from publisher.

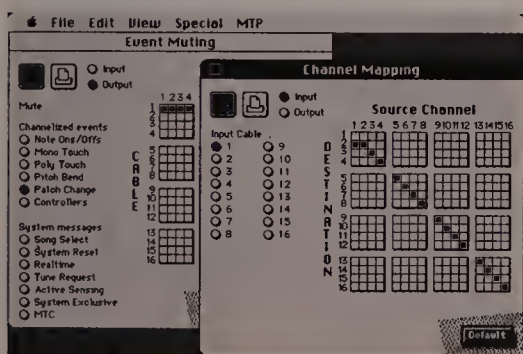
**Company:** Softsync. **Requires:** Mac Plus; hard disk. **List price:** \$595.



Accountant, Inc. Professional (AIP) is an updated version of Accountant, Inc., which contained General Ledger (G/L), Accounts Receivable (A/R), Accounts Payable (A/P), and Inventory Management modules in a single program. Although the program has been improved in many areas, the major change is that a Payroll module and a Job Costing feature have been added, making the program equivalent to Computer Associates International's Simply Accounting. (Layered's atOnce is in the same price range but does not include an Inventory module. CheckMark Software's MultiLedger, also in the same range, offers Inventory but not Job Costing.) AIP, like Simply Accounting, is a single-user package, although it can be shared on an AppleShare or TOPS network.

AIP works through conventional bookkeeping methods rather than in real time. This means that you must post G/L entries at appropriate intervals; they cannot be entered automatically each time you close an entry screen. In addition, the program has a data-saving facility that maintains data integrity should the system crash before posting. Unlike Simply Accounting's fixed 12 periods, AIP allows you to choose either a 12- or 13-period fiscal year, and the entire year's books remain continuously open so that you can make entries in any period. Unlike atOnce and other programs that allow more than a year's worth of periods to remain open, AIP entries are confined to the current year. And, AIP does not allow you to lock designated periods to prevent entries in the wrong month.

(continues)



### Manipulating MIDI

The key to the MIDI-manipulating talents of Mark of the Unicorn's MIDI Time Piece is its desk accessory. Two of its windows appear here. The Event Muting window lets you selectively mute 13 types of incoming and outgoing MIDI data. Here, the window is configured to mute any MIDI patch change messages that would otherwise be sent to output cable 1. The Channel Mapping window lets you route incoming and outgoing MIDI data to a different MIDI channel. Here, all incoming MIDI data received on channel 1 of input cable 1 is being routed to channel 2. You can save all MIDI Time Piece settings on disk.





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Although the terms *debit* and *credit* appear occasionally, the program demands little bookkeeping knowledge outside of the training provided in the documentation and tutorial.

### Making AIP Entries

A/R and A/P entries are made from either the Journals or Forms submenus. Any A/R or A/P entry that affects Inventory must be made from one of the electronic forms in the Forms submenu—an Invoice (for A/R sales), a Credit Memo (for returns), or a Purchase Order (for A/P items purchased for Inventory). There is also a fourth form for preparing, printing, and storing job quotations or estimates.

When you access the invoice form, you enter the customer ID, which can be either made up of letters, numbers, or a combination (see “AIP’s Electronic Invoice Form”). If you press Tab or Return in the ID field, a list of customers appears; you can click to select one. (You can also call up the Lists submenu, type the first few letters or numbers of the ID, and hit return; the program selects the closest match.) AIP fills in all billing and shipping information, along with any default information such as credit terms.

You can also use a scrolling list to pick inventory items to be shipped and billed. If there’s a problem with a selected inventory item—such as insufficient stock to fill an order—AIP alerts you. The program also tracks customer credit limits, warns you of sales over the limit, allows you to override the credit limit or cancel the order.

The program allows either balance-forward or open-account billing and provides separate forms for billing (or crediting) for merchandise or services. The Inventory module allows you to bundle separate merchandise items into a single inventory item that can be billed at a discount. The A/P module works in a similar way to prepare Purchase Order forms for vendors; it adds items to inventory.

You also make A/P, A/R, and General Journal entries—such as preparing a General Journal adjustment or recording a cash sale—from the Journals submenu, but these entries do not affect Inventory activities. You also

### AIP's Electronic Invoice Form

**Customer invoices for inventory items sold must be written on the electronic Invoice form selected from the Forms menu. The form makes excellent use of pop-up windows for selecting customers and inventory items. Sales not involving inventory items (as well as such things as customer payments and credits) are made directly from the Sales Journal in the Journals menu.**

enter customer payments, credits, and refunds, and print customer statements at the end of each period from the Journals submenu.

AIP's A/R module automatically calculates finance charges and early-payment discounts and allows partial payments on account. Simply Accounting's A/R does not. Also, AIP allows direct printing of checks from the G/L, while Simply Accounting doesn't.

### Payroll

The new integrated AIP Payroll module is similar to Simply Accounting's, but AIP's allows up to 50 defined deductions instead of only 3, and adds sales-commission tracking. You maintain the Employee list (like the Inventory, Customer, and Vendor lists) from the Edit submenu, where you add, delete, and update records. You can override individual items or deductions. Unlike MultiLedger's Payroll program, AIP posts hours to the employee records rather than in a single screen.

If you keep books for a small business with constantly changing employees and employee hours, you would be better off with MultiLedger (although you would lose job costing). If your work force and its hours are fairly stable, however, the Accountant, Inc. Professional process should present no problems. AIP provides all the necessary payroll reports, such as 940, FUTA, and SUTA, along with standard reports such as check registers, earnings summaries, and pay-period summaries. You can also print employee W-2 forms

at the end of the year.

Following what appears to be the current trend in bookkeeping programs, AIP provides payroll-tax update programs each year for \$95 (a discount certificate is provided for the first update). I hope MultiLedger's Payroll program, which allows the user to update tax tables, will inspire other publishers to do the same or at least give them that option.

### Other Features of AIP

Neither Simply Accounting nor AIP allows you to create true custom reports, but AIP does offer far more kinds of reports and limited customization. AIP also provides detailed reports on such things as which customers are ordering what inventory items, what inventory items are low, when did a customer last place an order, and what is his or her available credit. AIP can produce detailed reports on posted data that give you a much better audit trail than Simply Accounting. In addition, AIP lets you export reports to a word processor, spreadsheet, or database.

AIP offers Average or LIFO valuation of Inventory compared to Simply Accounting's Average method only. AIP provides horizontal password protection, which restricts certain users to specific segments of the program.

### The Bottom Line

AIP is a full-featured and comprehensive bookkeeping program that does a highly competent job of managing the books for a small business. The documentation is thorough. With AIP, Softsync includes a HyperCard tutorial stack, along with six sets of sample Charts of Accounts representing a variety of retail, service, and manufacturing businesses. The program, unfortunately, lacks the smooth and well-integrated Mac interface of a program like atOnce. The slick atOnce, however, does not offer integrated Inventory control.

In a nutshell, AIP offers you a direct alternative to the comparable but somewhat lower priced Simply Accounting. And Softsync has expanded Accountant, Inc. Professional to provide a much wider range of features and capabilities, thus justifying the price differential. —Alan L. Slay

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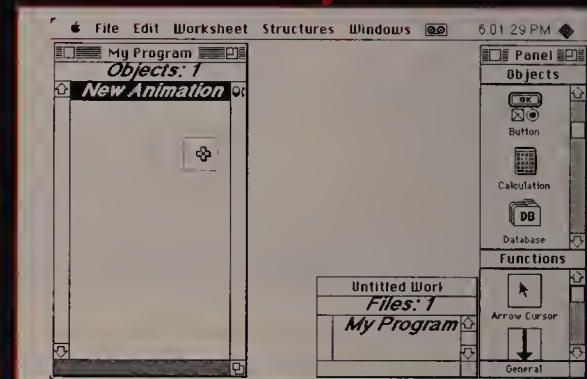
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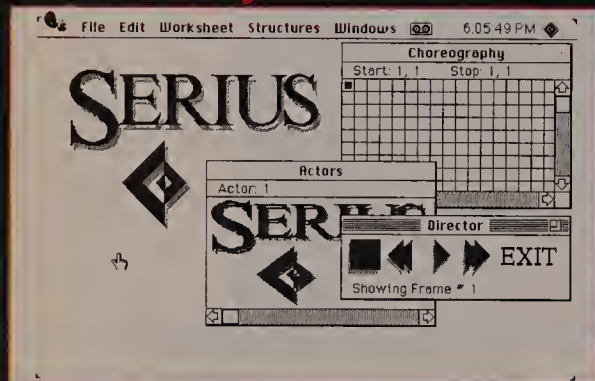
Launch the Serius application, then start your work. You build your programs by clicking and dragging object based icons.

## 3 Choose the Objects...



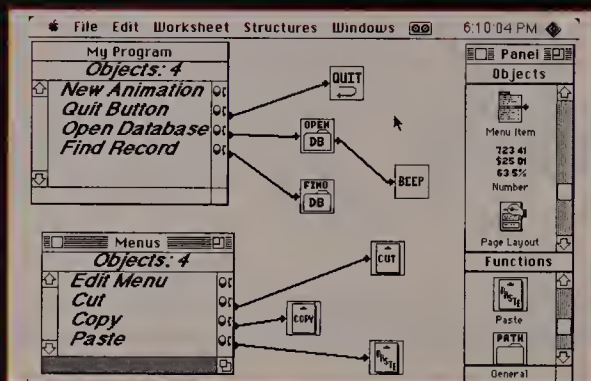
Objects are completely operational, bug free parts of applications. Simply choose which ones you want in your program by dragging them from the library palette.

## 4 Edit the Objects...



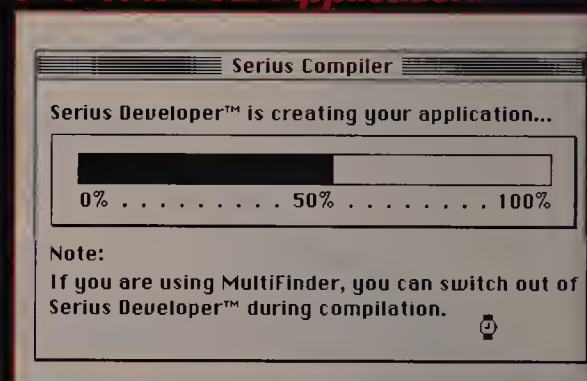
Once you have chosen the objects, simply double-click on each object. Windows and dialogs appear that allow you to set up the objects. The Animation Object is shown here.

## 5 Connect the Functions...



The functions instruct your program how to operate. Connect functions to a Button Object, for example, instructing your program what to do when the button is pressed.

## 6 Create Your Application.



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Watch this corner for information about the Serius Object Library.

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- Workstation 3.0
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★  
**Arcade Game**

## WELLTRIS

**Pros:** Successfully extends the Tetris metaphor; cheery folk music and captivating scenes; very challenging. **Cons:** Steep learning curve.  
**Company:** Spectrum HoloByte.  
**Requires:** Mac Plus. **List price:** \$39.95.

Let's start with a warning: If you get caught up in playing a delightful Macintosh arcade-style game, you risk repetitive stress syndrome. After an hour or two of Welltris my neck hurt—from peering into the well—and the muscles in my right hand and arm were ready for physical therapy. So stand up, walk around the room, stretch between games. I mean it.

And Welltris is worth it. A follow-up to the wildly successful Tetris—which was also created by Alexey Pajitnov, of the Soviet Academy of Sciences—Welltris presents a similar mix of cerebral puzzle and reflex-testing action game, accompanied by folk music and intriguing scenes from Soviet life. While you play, the right side of the screen has a changing slide show of scenery and buildings and even rock musicians. The high-score screen shows a jolly family sitting around a big table holding wine glasses up as if to toast the winners.

### Playing Welltris

As in Tetris, arrangements of squares—comprising from two to five squares each—are falling. In Welltris your job is to adjust their orientation as they fall so that they fill in the spaces in a 64-square grid at the bottom of a well. The pieces come into the game by sliding down one of the well's four sides. When a piece hits bottom it scoots across to land on the opposite side of the well (unless progress is impeded by pieces already in the grid).

The object of the game is to successfully convey as many pieces as possible to the bottom of the well. When a complete line of eight squares is formed, it disappears, and the adjacent row fills in the space it leaves, as in Tetris. Your score depends on how many lines you make, how fast you

move the pieces, how high you drop the pieces from, and other factors.

At the first level of difficulty the pieces travel down the walls at a stately pace, giving you enough time to figure out how to position them. Keyboard commands move and rotate the pieces. You choose between two move modes: one moves the pieces up and down, right and left; the other moves the pieces clockwise and counterclockwise. Using the default mode (up/down, right/left), it took me a long time to get the hang of moving around the walls—you have to switch from using the left-to-right keys along the bottom and top walls to using the up-and-down keys on the side walls. As hard as it is to explain or comprehend in words, it's even trickier to actually do. The clockwise-and-counterclockwise move mode seems more straightforward and intuitive.

At first it's relatively easy to fill in spaces on the grid. But it takes a lot of concentration to figure out where a piece is going to end up—and often there are two or three ways to get a piece into a particular space. Just to make things more complicated, if a piece is straddling a corner when it hits bottom it splits into two pieces, each of which zooms off in a different direction. Both of the pieces travel until one of them hits an obstruction; you have to think fast to figure out where they will stop.

As you continue to play, the pieces fall faster and faster. When the bottom of the well is obstructed and a falling piece comes to rest entirely or partly on the wall itself, the wall turns white and becomes inactive—no new pieces will fall down that side, and movement

along that wall is prohibited. A blocked wall is reactivated after three successive pieces (from the remaining walls) have been placed correctly. If all four walls become obstructed, the game is over. The game also ends if pieces are stacked to the top on one of the walls.

Welltris shares one annoying habit with Tetris. At one point—suddenly—even if you start from the simplest beginner's level, the game starts going too fast and the pieces fall with unmanageable speed. Within seconds most players are vanquished; I never got very far past this point (it has taken me about a year to progress past the comparable point in Tetris). A portrait of a beaming Alexey Pajitnov appears on screen just when the game gets near impossible (around 7300 points).

### Tashkent Is the Capital of Uzbekistan

Welltris uses an interesting quasi-copy-protection scheme. To begin a game, you must first answer a quiz question about one of the Soviet republics whose flags are pictured in the manual. Unless you are a Soviet scholar, and maybe even if you are, you need a copy of the manual to answer the questions. "What is the population of the republic whose flag is shown below?" asks Welltris, adding helpfully "(answer on p. 12 of manual)." Play enough and you will know the capitals and flags, if not the populations, of Estonia, Azerbaijan, and so on.

This is a tough, demanding game. I don't see it becoming a hit on Nintendo Gameboy or in video arcades. But you never know—my 14-year-old son tripled my high score easily on his first try.—**Felicity O'Meara**

*See Where to Buy or circle 871 on reader service card.*



### Which Way to Go?

While the piece is falling, you decide where to put it and how to get it there. This piece is destined to end up alongside the green and blue squares. You could drop it in place from the side wall or rotate it and drop it from the bottom. At right, a scene from Soviet life: the pizza truck.



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## DREAM MACHINE: THE VISUAL COMPUTER

**Pros:** Provides detailed background information and tools for creating custom presentations; video material is entertaining and educational. **Cons:** Some clips are incomplete when called up out of context. **Company:** The Voyager Company. **Requires:** Mac Plus; hard disk; videodisc interface cable; HyperCard. **List price:** Videodiscs \$49.95 each; LaserStack software \$59.95.

## MARTIN LUTHER KING JR.

**Pros:** Videodisc includes a wealth of historical footage; provides hypertext support material and tools for creating custom presentations; documentation includes teaching aids. **Cons:** Expensive. **Company:** ABC Interactive, distributed by Optical Data Corporation. **Requires:** Mac Plus; hard disk with 2MB free space; videodisc interface cable (included for Pioneer LD-V2200 or LD-V4200 model videodisc players). **List price:** \$395.



Videotapes are fine if you want to view a sequence from beginning to end, but they're terribly inconvenient when you want to study just one frame, examine a particular scene, watch a group of nonsequential events, or just skip a few scenes. Videodiscs, however, allow you to do all of these things easily, because they allow random access. They also provide a higher-quality picture using the same kind of optical digital storage technology that gives audio CDs their superior sound. For applications that require nonsequential access to video clips and don't involve recording new information, videodiscs are the way to go.

But the true power of a random access storage device isn't available without a computer to control its logic. That's why the industrial (as opposed to consumer) videodisc players like the Sony 1200 and the Pioneer 4200 have RS-232 interfaces built in. When the appropriate cable connects this port

to one of the Macintosh's serial ports, controlling a videodisc can be as simple as navigating a HyperCard stack.

There are a number of products on the market that take advantage of the HyperCard-videodisc connection. Among the best are those from the Voyager Company and Optical Data Corporation.

### Dream Machine

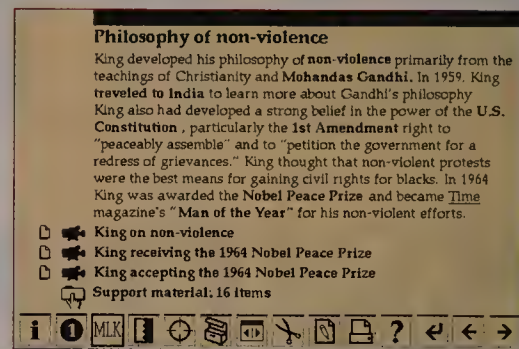
Voyager's Dream Machine package is built around a pair of hour-long videodiscs. Volume I: The Visual Computer is an overview of the uses of computer graphics in entertainment, business, education, science, and graphic arts, with behind-the-scenes looks at how many of these powerful images are created. It's a fast-paced, highly entertaining hour of stunning images accompanied by an electronic musical score. Volume II: Computer Dreams is even more electrifying, with less commentary and longer animation sequences.

Because they're designed to stand alone, it's best to view each disc at least once from start to finish. When you're ready to take a second look at the clips, you can use LaserStack, the HyperCard guide and index, to quickly find what you want.

But first you need to connect the videodisc player to the Mac and adjust settings in the stack for player type and baud rate. The next step is to tell the LaserStack, using familiar HyperCard buttons, which disk and which side you're viewing. The rest is completely up to you.

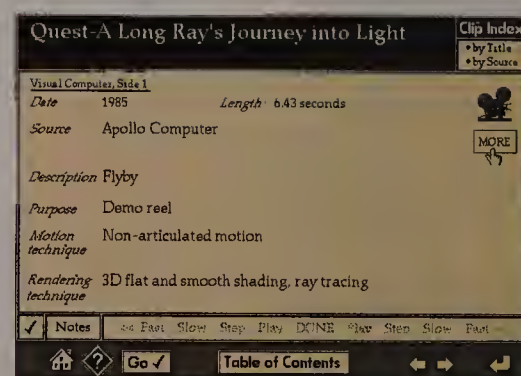
### Dream It Again, Sam

If you want to find out more about any of the clips on the disk or view any of the clips again (at regular, fast, slow, or step speed; forward or backward), you can click on the appropriate buttons in the Video Clips section of the stack. You can browse through the clips in order or retrieve them from a Clip Index in which they're sorted either by title or by source. If you prefer, you can see all clips related to a particular topic while listening to the related audio commentary. Or you can use the glossary to learn about a particular graphics technique while viewing video illustrations of that word. The LaserStack software turns the two vid-



### Historical Hypertext

The boldface words on this screen are linked to other screens; the list of topics in the center provides access to video clips with corresponding Mac text windows.



### Graphic Details

The Dream Machine LaserStack provides information on every clip in easily accessible form.

eodiscs into a customizable short course in computer graphics.

As you're exploring clips, you can click on an icon to add the current clip to your personal video clip list, just as you might note a page number of a book for future reference. Whenever you like you can examine, edit, or print your clip list. What's more, you can show all of the clips in your list in order with the click of a button. Working with a clip list is almost like creating your own custom videos.

Of course, you're limited to the material on the discs; and many of the segments, edited to be part of a video collage, seem to be too short and to end abruptly when pulled out of context. Still, the possibilities for teachers and students are staggering.

### News, Interactive

Unlike the Dream Machine videodiscs, the discs in the ABC News Interactive series are designed specifically for use with the accompanying HyperCard stacks. ABC's Martin Luther King Jr. package is a good example of the ways computer technology plus video archives can bring history to life. (continues)



# Five lessons other companies have yet to learn about PostScript® printing.

**1** Genuine Adobe® PostScript.® You need a true Adobe PostScript printer. The Silentwriter2 290 printer from NEC. Some companies emulate PostScript with clone interpreters or add-on cartridges. Others have limited font capabilities. But that's not the way to produce eye-popping newsletters, or 3D charts. We've known this since we introduced our first Silentwriter LC 890 printer back in 1987.

**2** MS-DOS® and Macintosh® Connectivity. That's right, the 290 works with both Macintosh and PC-compatibles. And with its standard Centronics parallel, RS-232C, RS-422 and AppleTalk™ interfaces, the 290 is ideal for stand-alone or network environments.

**3** WYSIWYG Screen Fonts. As in What-You-See-Is-What-You-Get. Our printer support kit included with every 290 we sell includes software that lets you see all of the printer's 35 scalable typefaces before you print them out. Also included are diskettes that allow you to install the fonts on any Macintosh or under Microsoft® Windows™ in the MS-DOS environment.



**4** Memory. With a full 2 MB of standard memory, there's simply no more worry. Since now you have more than enough memory to print a full page of text and graphics (letter or legal size) without losing valuable data. Plus the optional user-installable 2 MB of additional memory satisfies your need to store downloadable fonts and overlays.

**5** Software. The Silentwriter2 290 is the printer of choice for MS-DOS or Macintosh users working with hundreds of the most popular software packages. With an installed base of over 100,000 Silentwriters, our experience with printer software is hard to beat. Meaning you get more than just a printer, you get answers.

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# NEC



LUIS DELGADO



The HyperCard stack is a series of picture menus that enable you to use a mixture of film clips, still photographs, maps, and documents to explore King's life, times, work, philosophy, and impact on civil rights in the United States. The disc is divided into several sections, each of which is controlled by a HyperCard picture menu.

After hearing an optional audio overview by Ted Koppel, you are free to explore the disc. Listen to a portion of a speech on the philosophy of non-violence, for example, then read the accompanying HyperCard screen about King's visit with Gandhi in India, then bring up a map on the video monitor showing the two endpoints of the trip, and so on. Listen to part or all of the "I Have a Dream" speech on the TV while following the text on the Mac screen. You can also take notes on the Mac for future reference. Put together your own minidocumentary from the wealth of materials packed on the disc, and then have them play back in order. You can even switch to the second audio channel, which translates everything to Spanish.

Once you become familiar with the stack's icons and its hierarchical structure, you'll find this package easy to master. My 12-year-old son put together an impressive video collage after just a couple of hours.

#### Videodiscs for Everybody?

Clearly the market for these packages is limited. Few Mac owners currently have computer-controllable videodisc players attached to TV monitors. But schools and libraries are already putting these videodiscs to work.

Additional innovative packages should be on the way soon. The ABC News Interactive series promises titles on the workings of the U.S. govern-

ment and on AIDS (previewed at the Exploratorium in San Francisco in conjunction with the Sixth International Conference on AIDS), while Optical Data and the Voyager Company have expanding catalogs of HyperCard-controllable educational and entertainment discs. As the demand grows, hardware costs should drop to the point where more families will be able to join the videodisc revolution.

—George Beekman

See Where to Buy or circle 734 (*Dream Machine*), 812 (*Martin Luther King Jr.*) on reader service card.

#### Font-Menu Customizers

### ADOBE TYPE REUNION 1.0

**Pros:** Shortens long font menus.

**Cons:** Does not work well with merged font files; delays appearance of menus.

**Company:** Adobe Systems. **Requires:** Mac Plus; System 6.0.2; Finder 6.11. Hard disk recommended. **List price:** \$65.

### FONTINA

**Pros:** Eliminates scrolling through long font menus; groups all weights, sizes, and styles of a font together.

**Cons:** When numerous fonts are installed, font menu becomes hard to read.

**Company:** Eastgate Systems. **Requires:** Mac 512KE; System 6.0.2; Finder 6.1. **List price:** \$69.95 each; ten-pack \$295.

### MENUFONTS 3.0

**Pros:** Displays font names using their own (or any selected) screen fonts.

**Cons:** Doesn't shorten font menu; menu sometimes scrolls slowly.

**Company:** Dubl-Click Software. **Requires:** Mac 512KE; System 6.02; Finder 6.1. **List price:** \$59.95.



Apple broke out of its early 256-font limitation over a year ago when it introduced support for NFNT (New FoNT) resources, which gave every Mac the capability of using hundreds, even thousands, of fonts simultaneously. But as scores of new typefaces become available, the shortcomings of the Mac's font-handling methods become in-

creasingly bothersome. The more fonts you install, the longer the font menu becomes. If you need access to most of the Adobe screen fonts (almost a thousand), you feel as if you're watching your life pass before your eyes every time you scroll to find the face you want.

These three products try to improve the look and feel of the standard font menu, each addressing a particular shortcoming. Your own needs and preferences should determine the best product for you.

#### Adobe Type Reunion

Adobe's new Type Reunion is an INIT that groups all available styles of a font by familiar name in a hierarchical menu. This not only drastically reduces the size of the font menu, but makes it much easier to see and select the exact style you want.

Many typefaces are available in more than the basic plain, bold, italic, and bold italic styles; some have ten or more different styles of varying weights. Until now, Adobe's convention of beginning the name of each variant with an abbreviation representing its style has made it impossible to tell at a glance which font styles, and how many, are installed. For example, the bold versions of Adobe fonts are all preceded by the letter *B* and are listed together on the alphabetized font menu, regardless of the base font's name. Say you have tons of fonts installed, and you want to change Americana Bold (listed as *B Americana Bold*) to Americana ExtraBold (*XB Americana ExtraBold*). You'd have to scroll from one end of the menu to the other, assuming that Americana ExtraBold is indeed available.

Type Reunion reunites what Adobe's naming convention has rent asunder. If you want to select a particular weight of Avenir, for example, you just scroll to the Avenir entry, and select the style you want from Avenir's hierarchical menu (see "Style Hierarchy"). Type Reunion is even smart enough to order styles by weight, with the heaviest on the bottom.

Type Reunion, however, poses a few problems of its own. It won't list styles contained in font families that have been merged using utilities such

(continues)



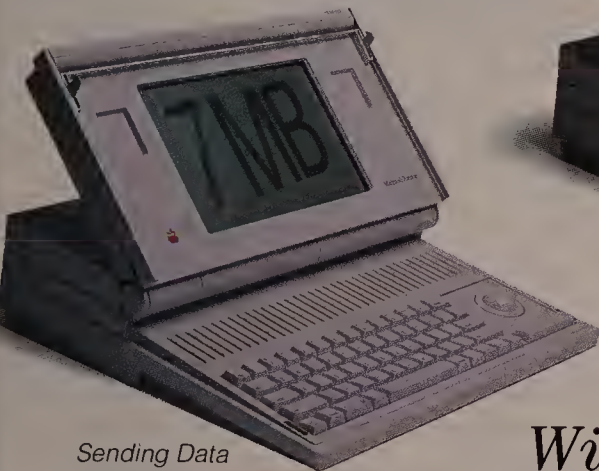
# Decisions, Decisions, Decisions.



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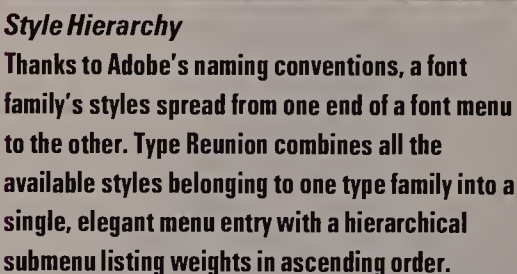


Type Reunion causes a slight delay whenever you select a menu from the menu bar, even if it's not the font menu. You can bypass Type Reunion and access the standard font menu at any time by holding down the Shift key as you select the font menu.

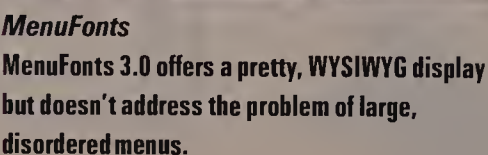
Where Type Reunion makes using multiple fonts easier by shrinking the font menu, Eastgate Systems' Fontina version Albuquerque 12 (the company uses names, not numbers, to label versions) does it by enlarging the font menu from a single column to as many columns as are necessary to fit all the available font names onto the Mac's screen at once (see "What You See Is What You've Got"). No scrolling is necessary—you just drag the cursor to the font you want to select.

270

Fontina displays all active fonts at once, narrowing every column, adding more columns as necessary, and truncating the display of each font's name. This could be a problem as names proliferate, except that as you drag the cursor over the menu, Fontina always displays the full name of each



***What You See Is What You've Got***  
Fontina puts every available font on screen at once, so no font is more than a flick of the wrist away. The font name appears at the top of the screen in the menu's font and its own screen font.



MenuFonts 3.0 is compatible with most applications; you can use the `cdev` to deactivate it if you encounter any problem applications.

Because Type Reunion and Fontina are reasonably priced and are compatible with each other, you might want to use both together. If you do, you can select Type Reunion's font menu and, by holding down the Shift key, also be able to use Fontina's menu. It's the best of both worlds.

—Eric Taub



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★  
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## FILE FORCE 1.0.1

**Pros:** Good examples, tutorial, and manuals; good networking features; easily customizable, with a variety of programming facilities. **Cons:** Still more complex than flat-file database managers.

**Company:** ACIUS. **Requires:** Mac Plus; System 6.0.3; hard disk. **List price:** \$395.

**F** 4th Dimension is probably the best-known Macintosh database. Part of 4D's fame, however, is its reputation for complexity; it has never been a first choice for database novices with simple mailing-list chores, for example. With File Force, ACIUS hopes to reach a wider market of users who don't require all the facilities and complication of 4D, but who need a networkable, relational database.

### 4D Lite

Is File Force the long-awaited "4D Lite"? That depends. At one level, it can be used as a straightforward list manager, and there's a mailing-list example that can get you started right away. If you use the program only in this basic way, however, you're not getting much for \$395. At another level, you can make File Force perform a dazzling array of automated custom functions, but you'll have to study the manual's section on "passing values to global procedures using special local variables." Used this way, File Force gives you your money's worth, but it's unlikely that nonprogrammers will be able to puzzle out all the nuances of advanced usage.

### Goodies

ACIUS's experience as a Mac database vendor clearly helped design this product. Simply because a relational database with separate data files and structure files takes more planning than a flat-file one, relational databases tend to be a more formidable challenge for beginners. ACIUS has helped flatten this barrier by providing a set of example databases that cover most common applications, from mailing lists and invoices through expense reports and phone messages. Many database chores can be handled directly with

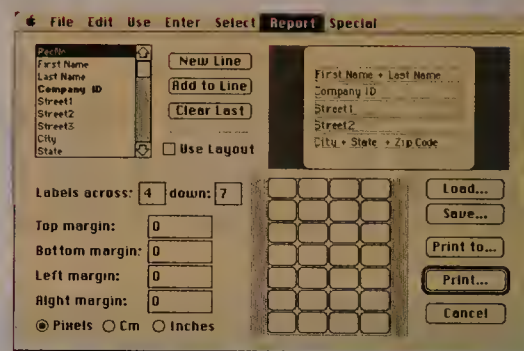
these examples or through a few easy extensions. To keep you happy at the entry level, the program has one of the nicest label-making facilities ever included in a mainstream database product (see "Playing Tag"). If you intend to graduate to a relational database from the flat-file manager you are now using, you can import existing files into the examples (with a bit of tailoring) and may never need to do anything fancier than this.

If you want fancy, File Force can provide that too. Sample layouts to use or modify are also provided in profusion, including multipage data input and output. A palette of drawing tools lets you customize output forms. Forms can include not only the expected PICT files as fields but 8-bit color pictures as well. Output and data reporting are both enhanced by the availability of eight types of File Force-generated graphs, updated with each change in data. Since you can write scripts to automate common functions (validating data entry on input layouts, for example), File Force offers not only buttons for running the scripts but a selection of nifty clip art buttons. There are also Global, Layout, and File procedures, produced with a procedure editor that contains the equivalent of a menu-driven modern programming language.

### Sure and Fast

File Force has two more desirable traits: there's a complete security system and respectable search-sort speed. Security proceeds through Designer, Administrator, Owner, and User/Group levels, delimiting authority to change data, layouts, report forms, and passwords on a multiuser system. As a network product File Force is perfectly straightforward, requiring only that you buy a copy of the program for each participating Mac and keep your data files on the network server (and structure-file copies on each local hard disk).

File Force 1.0.1 posted faster results on most types of searches than 4th Dimension 2.0 itself, although 4D version 2.1 will use the new database-engine tricks already included in File Force. This means, approximately, that simple searches over 1000 records take four to six seconds, depending on the



### Playing Tag

**File Force does a spectacular job of label management, a function that seems humdrum but is often crucial to practical use of a database. You can customize and preview label formats with a few simple feature selections.**

data. Curiously, complex searches using logical conditions and "contains" instead of the equal sign (=) were as fast or faster. Users who are accustomed to the nearly instantaneous search results seen in the leading flat-file managers (FileMaker II, Panorama, Microsoft File) or in relational speed demon FoxBase+/Mac may find this poky, but it means that throughput won't be a serious problem except for data files larger than 20,000 or so records.

### File Under . . . ?

Most Macintosh users who want a database for a single computer don't need all the features of a relational database. Conversely, Mac users at large corporations will find that a relational database like File Force doesn't offer enough (there's no way to program connectivity, for example). File Force is an appealing package for a small office with three to six connected Macs. At this level, a relational database is important; but simplicity is equally important in practice, since there usually isn't a programmer available. Unfortunately, there is probably a certain population of 4D purchasers in this small-office setting that would have been better served by File Force, if it had been available. Although ACIUS can't make the inherent conceptual work of relational-database design disappear altogether, the examples, tutorials, and documentation in this package make you believe you're more likely to succeed in automating a small-office work load with File Force than with its big brother 4D or with 4D's competitors.

—Charles Seiter

See Where to Buy or circle 741 on reader service card.



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File- and Text-Finding Utility

## ON LOCATION 1.0

**Pros:** Fast; easy to use. **Cons:** Nonstandard user interface; background indexing needs improvement. **Company:** On Technology. **Requires:** Mac Plus; System 6.0. **List price:** \$129.95.



Information is useless if you can't find it. As hard disk capacity has increased, being able to locate data on the disk has become more difficult. And often, finding files just isn't enough; you need to find text within documents. On Location, the first product from On Technology, is a desk accessory that finds files by name and finds text in files, at speeds that are nothing short of incredible. And once it finds what you're looking for, you can view, copy, and print the document from the DA.

Setting up On Location is easy. You simply copy three files and a folder into the System Folder on the hard disk and use Font/DA Mover to install the On Location desk accessory. You can, if you prefer, access the DA with Suitcase II or MasterJuggler. Restarting completes the installation.

After opening the On Location DA, you select Create Index from the On Location menu. First-time index creation can take a fair amount of time, especially if you have more than one hard disk. The program indexed file names and text in files on my 140MB hard disk (133MB used, 1505 files in 187 folders) in just under 33 minutes. The size of the index was 438K, well under the 2 percent index size On Technology says is typical (partly due to the fact that there are more applications than documents on my disk).

## Zeroing In

You can choose to search for file names or for the text in files. If you don't enter any search text, On Location finds all files; but as you enter search criteria, it narrows the search with each keystroke. You can further narrow the search criteria using pop-up menus; when searching for files by name, you can search for files that contain, match exactly, start with, or end with the search criteria. When

searching for text in files, you can tell On Location to look for exact matches or text that matches the root of the search text. This feature usually worked well, but it could use some improvement. When I searched for *run* with root matching, On Location found files that contained *running*, but not files that contained *ran*. Past-tense forms of words were usually missed by the root-matching option. The program never took more than a few seconds to find by file name, and searches of text in files were invariably complete within ten seconds.

As On Location finds files, it adds the results to its own file list. Double-clicking on a file in the file list opens a View window that shows the contents of the file, which can be copied to the Clipboard. You can also find other text within the View window using the Find and Find Next buttons. On Technology has licensed Claris Corporation's XTND file-reading technology, which allows you to view the text in the original fonts and styles, whether or not you have the application that created the file. On Location ships with file readers for 14 Mac and IBM-PC applications; text from other applications is displayed in 9-point Geneva. From the file list, you can also print, copy, move, delete, and rename files and create new folders.

## Interface Wars

Despite its ease-of-use, On Location is certain to annoy Macintosh-interface purists. It uses window, button, and dialog-box treatments that are reminiscent of the Next computer system. What's worse, by creating its own windows and buttons, On Technology has made On Location incompatible with

some common utilities. For example, my Page up and Page down QuicKeys don't work with On Location's non-standard scroll bars. User-interface innovations should be applauded when they result in bringing better ways of doing things to the desktop, but On Location's interface is a triumph of style without any added substance.

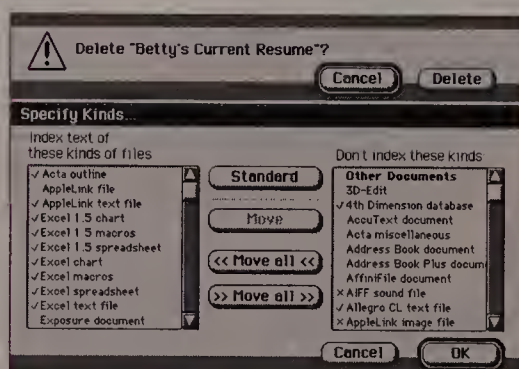
## Finding Faults

On Location has a few minor quirks that should be addressed. The current version doesn't always find numbers, although combinations of letters and numbers seem to work fine. Automatic updating of indexes in the background is designed to occur when the Mac isn't busy. Unfortunately, the program's definition of busy includes only keyboard use, mouse movements, and times when the menu bar is highlighted (some applications highlight the File menu while printing, for example). Serial-port activity isn't taken into account by On Location. So if you're using a modem to download information when On Location begins updating automatically, the transfer speed is significantly reduced—costing you time and money. It's possible to turn the Autoupdating feature off, but doing so before every online session is inconvenient. On Location should check to see if serial ports are in use before it begins background operations and delay updating if they are.

Like many other new programs, On Location's performance suffers in low-memory environments. Creating indexes and autoupdating on a 1MB Mac can be very slow, although finding files is acceptably speedy. Apple has stated that 2MB of RAM will be required to use the upcoming System 7.0, and it is apparent that many software manufacturers are already optimizing their programs for Macs with more than 1MB of RAM.

Stacked up against On Location's strengths, however, these problems are not terribly important. It's an inexpensive utility that's easy to use and works exceptionally well. It far outdistances its competition in speed, does things that no other utility does, and brings the functions of several utilities together in one well-thought-out package.—Tom Negrino

See Where to Buy or circle 825 on reader service card.



## Next Window, Please

As these dialog boxes show, On Location shows a unique face to the world. It's not necessarily a better face, just different.



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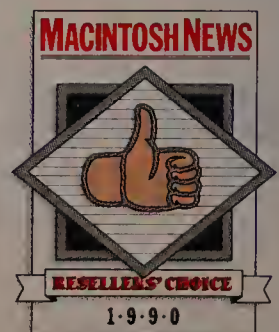
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Circle 275 on reader service card



★  
CD ROM Drives

## CD TECHNOLOGY PORTA-DRIVE

**Pros:** Good access time; transportable.

**Cons:** No audio-out jacks; cumbersome volume control; no power indicator; required cables cost extra. **Company:** CD Technology. **Requires:** Mac Plus; System 6.0. **List price:** \$895; bundled with Microsoft Office CD ROM \$1295.

## NEC INTERSECT CDR-72

**Pros:** Good audio facilities.

**Cons:** Slower than the other drives; required driver software costs extra. **Company:** NEC Technologies.

**Requires:** Mac Plus; System 6.0.

**List price:** \$999; driver software \$99.

## TXM-3201A1-MAC

**Pros:** Good access time. **Cons:** No audio-out jacks; cumbersome volume control; no power indicator; required cables and software drivers cost extra.

**Company:** Toshiba America Information Systems. **Requires:** Mac Plus; System 6.0. **List price:** \$995; Macintosh-compatibility kit \$130.



Apple led the way with CD ROM in the Macintosh world by introducing the AppleCD SC player in 1988; it was a good drive that had the usual Apple drawback—it was expensive (\$1199). As CD ROM has gained in popularity, Apple has dropped the price on its drive to \$899 and several third-party drives have come on the market.

I evaluated three of these new drives, from Toshiba, CD Technology, and NEC, and discovered that you can now buy better performance than Apple's for the same price. My pick, the CD Technology Porta-Drive, is smaller, faster, and portable, yet costs the same as the AppleCD SC, although at the cost of some convenience features.

### Toshiba TXM-3201-A1

Toshiba's CD ROM drive is a compact unit with a footprint that's about the same as that of a Mac SE. It has a



The CD Technology Porta-Drive (top), the TXM-3201A1-Mac, and the NEC Intersect CDR-72

minijack on the front panel for headphones, and a three-position volume-control switch, which lets you choose between quiet, OK, and a bit too loud. A rotary volume dial would be much better. The front panel also has a drive-access light and an eject button, which is disabled by the software driver.

Missing is a power-indicator light. As it is now, the only easy way to tell that the drive is on is by pushing a CD into the unit; if it slides in easily, the drive is on. The drive has no preamp audio-out jacks; so to use the drive as an audio CD player, you have to use headphones or an adapter with your speakers.

There are two SCSI connectors on the rear panel, the drive is not terminated, and the SCSI ID can be changed via DIP switches. The drive requires an expensive (\$130), separately priced Macintosh compatibility kit, which consists of the driver software and the necessary SCSI cables.

Toshiba doesn't write its own software drivers, it purchases them from OMI. The version I reviewed, 1.2, worked fine for the most part, but has a bug that prevents it from seeking and accessing a portion of an audio CD longer than one hour. The driver ignores requests to seek to positions higher than 60:00; although if you start playing before the 60:00 mark, it will continue to play through just fine. Another drawback of the 1.2 driver is that it will not mount a CD ROM as an AppleShare volume. At press time Toshiba had promised to ship a bug fix by fall.

The Toshiba and CD Technology drives share the same Toshiba drive mechanism, and this mechanism is the winner in speed tests among currently shipping CD ROM drives, easily beating drives from NEC and Apple. An average hard disk, however, delivers access times of 28 milliseconds; a blazingly fast CD ROM unit's access time is measured in *hundreds* of milliseconds. I used two simple, real-world tests; copying a large (4MB) HyperCard stack to a hard disk, and opening the same stack from the Finder. I did each test several times, with the Mac's RAM cache turned off.

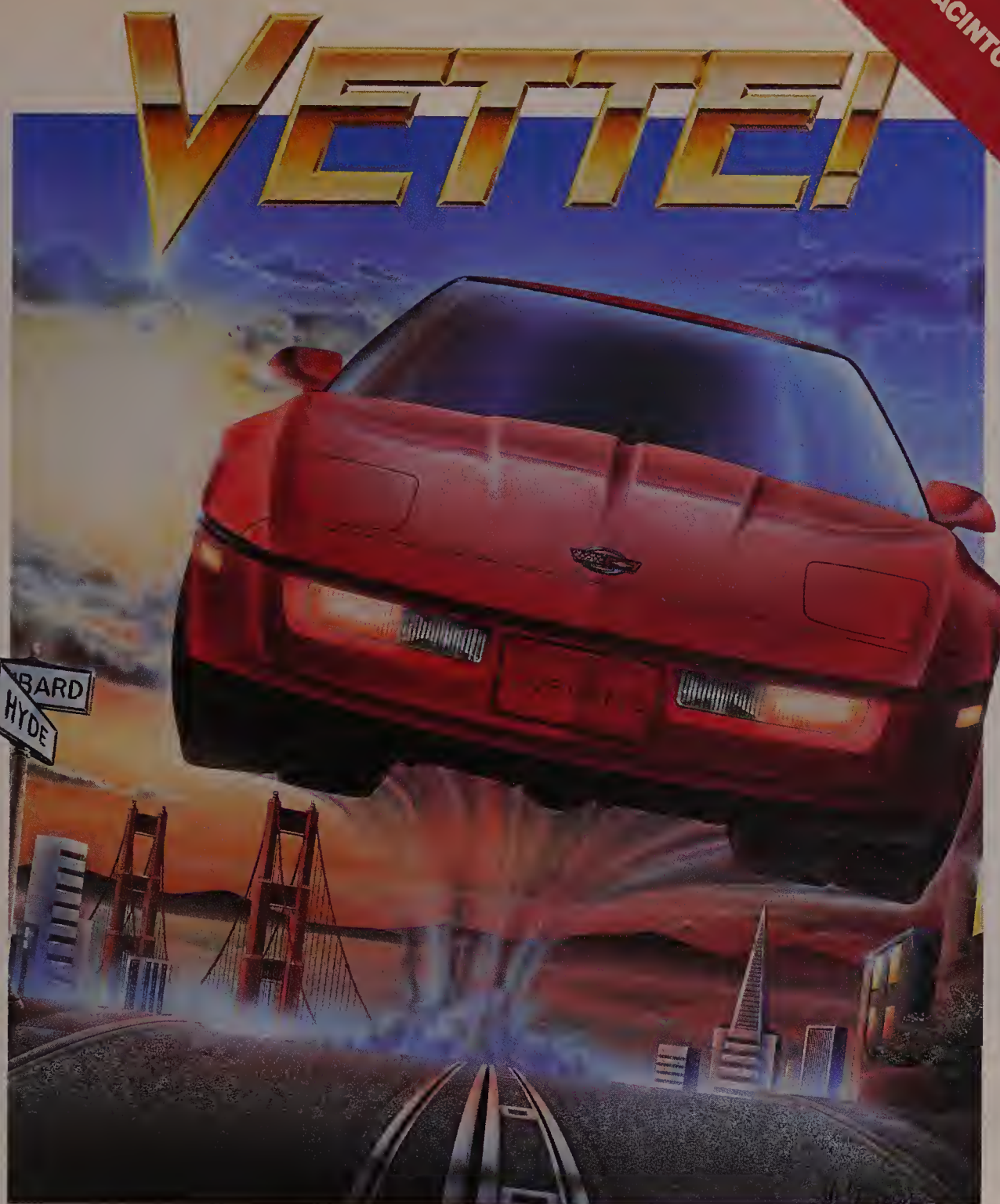
### CD Technology Porta-Drive T3201

As its name says, the Porta-Drive is designed to be carried with you. It's the smallest and lightest of the three drives tested, partly because the AC power supply is a separate box that you plug into the drive's rear panel.

The Porta-Drive shares the same drive mechanism as the Toshiba, hence the same performance figures. However, the Porta-Drive comes with a later version of the OMI software driver (1.3), which allows it to randomly access an audio CD longer than 60 minutes and fixes the AppleShare problem. At press time, CD Technology stated that it plans to revise its drive hardware to include stereo preamp jacks, a push-button SCSI-ID setting switch, and a power indicator.

Disappointingly, CD Technology sells the SCSI cable and terminator separately for \$40, rather than including (continues)





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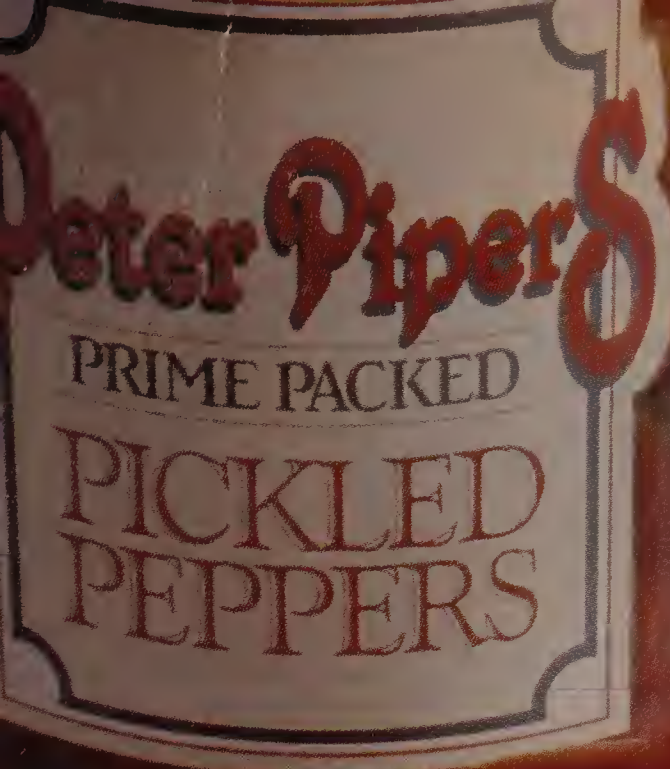
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Circle 258 on reader service card



ing it with the drive, although driver software is included with the player. An optional \$200 battery pack and a \$60 carrying bag are also available.

The \$895 Porta-Drive is offered in a bundle with the Microsoft Office CD ROM for another \$400. The CD ROM includes Microsoft Excel, Word, PowerPoint, and Mail, plus an extensive HyperCard-based documentation system, a complete set of Adobe screen fonts, and megabytes of other goodies (see *Macworld, Reviews*, June 1990.) Microsoft Office lists for \$949, so bundled with Porta-Drive it's a great deal. CD Technology has extended this offer indefinitely but could change this policy at any time, so check with the company before you buy.

#### NEC Intersect CDR-72

The NEC CD ROM drive is nicely designed, with a front-panel headphone jack and a rotary volume control that's much more convenient than the three-position volume switch on the other two drives. It also has a power switch and a power indicator on the front panel. The rear panel sports audio-out jacks, a switch to set the drive to accept either 110 or 220 volts, a set of DIP switches that set the SCSI ID, and the two SCSI connectors. The drive is not terminated.

NEC, however, sells the driver software necessary to use the CD as a \$99 "option"—a disadvantage, since there is nothing optional about it. This package includes the driver software and Music Box, an application or DA (both are supplied) that plays audio CDs,

although the NEC driver also supports Apple's Audio CD Access INIT and CD Remote DA.

The NEC drive was quite a bit slower than the other two, taking twice as long to open my HyperCard test stack (the Communications stack from Brøderbund's Whole Earth Catalog CD). NEC's stack-copying speed was also slower than the other drives' (see "CD ROM Drives Compared").

#### The Final Spin

The state of the CD ROM drive market seems to be much like that of Macintosh hard disks a few years ago. Because there aren't that many to choose from, manufacturers can get away with charging extra for required components like driver software and SCSI cables. And prices for these drives are still high.

The NEC drive wins points over the Toshiba and CD Technology units for its better audio facilities, but falls to the rear of the group because of its slower speed and expensive "optional" software. The Toshiba and CD Technology drives are both good units, but I'd pick the CD Technology unit by a nose because it's less expensive, can be made portable with the accessory battery pack, and takes up less space when it's on the desktop. And if you need the applications in Microsoft Office, the Porta-Drive's bundling offer makes it an excellent value.

—Tom Negrino

See Where to Buy or circle 715 (CD Technology Porta-Drive), 819 (NEC Intersect CDR-72), 859 (TXM-3201A1-Mac) on reader service card.

#### CD ROM Dictionary

### WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY, CD ROM EDITION

**Pros:** Contains complete text of *Webster's Ninth New Collegiate Dictionary*; plays recorded pronunciations for all words in main dictionary; networkable (with multiple copies or site license). **Cons:** Does not operate with word processors; requires 770K MultiFinder partition; poorly designed, often frustrating interface. **Company:** Highlighted Data. **Requires:** Mac Plus; CD ROM drive. **List price:** \$199.95.



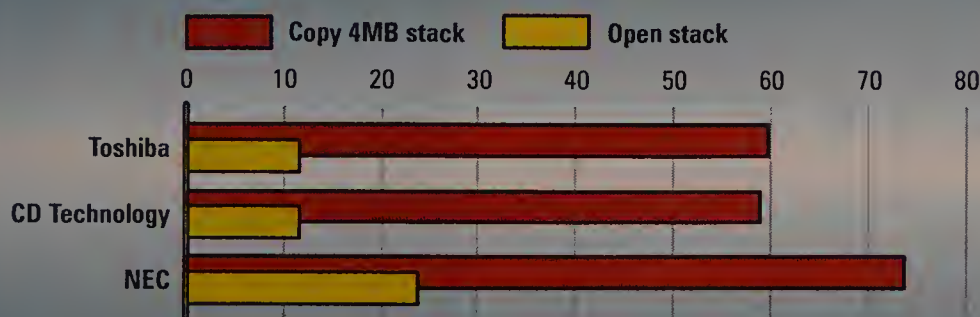
Like everyone else who's shelled out some money for a CD ROM drive, I've been waiting for a product that justifies all the hype (and expense). In my case, I keep looking at my volumes of writer's reference books and wondering when I'll be able to replace them with a single, well-designed, carefully integrated CD. Thus it was with some anticipation that I received the Webster's Ninth New Collegiate Dictionary, CD ROM Edition. Although the disc is the electronic equivalent of just one reference book, it is the first complete dictionary for the Macintosh in any medium, and I was eager to see how well it fulfilled its CD ROM potential.

#### Webster's Ninth

Webster's Ninth is composed of the CD ROM disc itself and the engine that runs it. The disc contains an exact copy of the print edition of *Webster's Ninth New Collegiate Dictionary*, published by Merriam-Webster, with complete entries (including pronunciation, etymology, definitions, and examples), all illustrations and tables, a style manual, a list of U.S. and Canadian colleges and universities, and dictionaries of abbreviations, geographical locations, foreign words and phrases, and biographical information, plus recorded pronunciations for the words in the main dictionary. All of this is quite a bit more than the nearest competitor in Macintosh online dictionaries, Deneba's Spelling Coach Pro-  
(continues)

## CD ROM DRIVES COMPARED

Measured in seconds

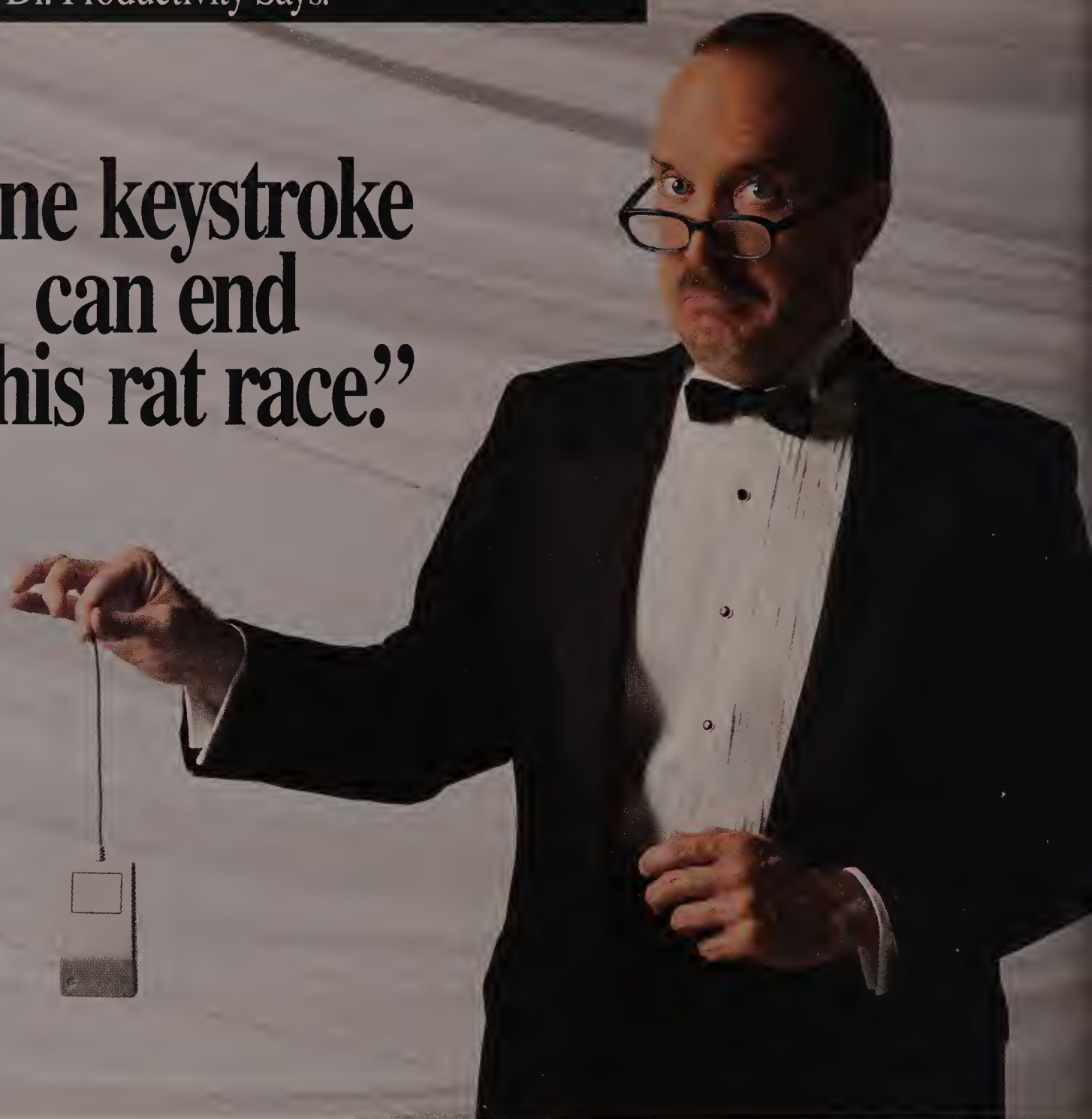


The Toshiba and CD Technology drives, both based on the same Toshiba drive mechanism, were notably faster than the NEC drive, which took twice as long to open the HyperCard stack.



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launch a program or set up a page. Define keys that enter entire paragraphs, or insert addresses, names or formulas. Anything you do repetitively, you can do in less time, with less aggravation. A stroke of genius.”

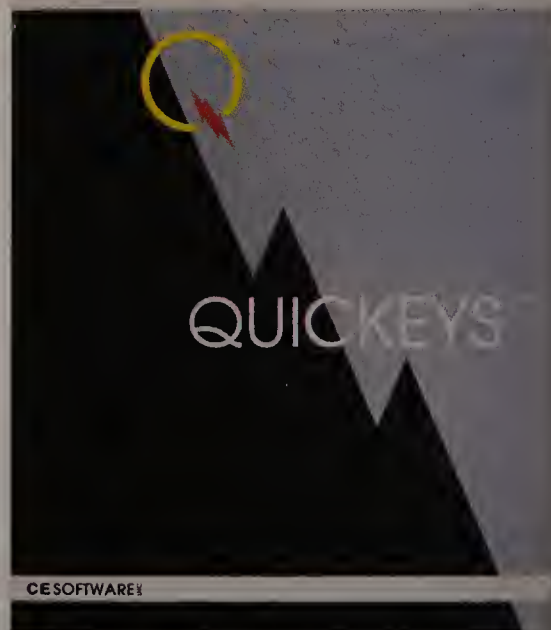
**“Reviewers have spared  
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of QuickKeys.”**



“MacUser gave QuickKeys a four-mouse rating and an Editor’s Choice Award. Robert Wiggins, of *MacUser*, says ‘It could send your mouse to retirement.’ *MacWorld* named QuickKeys as one of the Goodies You Can’t Be Without. *MacGuide* readers awarded it the Golden Gavel. *Byte* says, ‘QuickKeys is right up there with sliced bread, the Great Pyramid of Cheops, and other wonders.’ The raves go on and on.”

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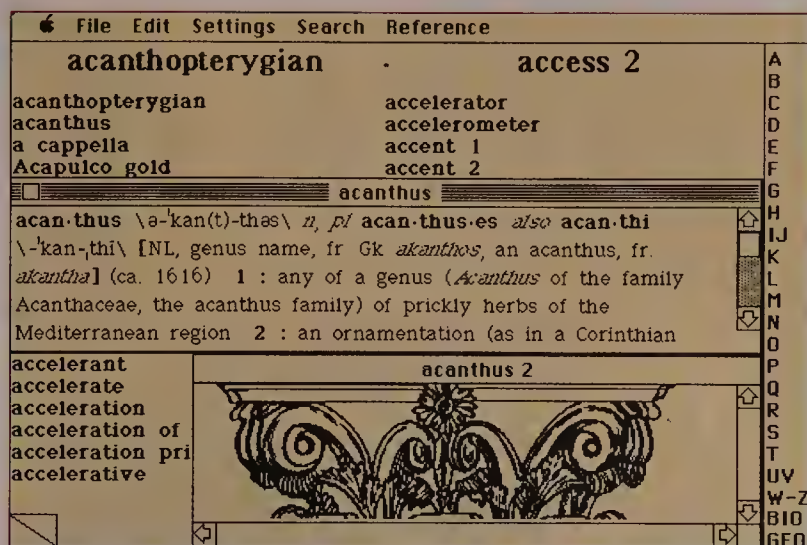
fessional, which contains no pronunciation guide (written or spoken), etymology, or examples. On the other hand, for about the same price, Spelling Coach Professional includes a name-brand, online thesaurus and spelling checker.

The engine that puts Webster's Ninth on screen and plays the recorded words is a stand-alone application provided on an accompanying floppy disk. Your print dictionary doesn't force you to clear everything off your desk each time you use it and neither should an electronic dictionary, but this one does. If you are running under the Finder, you must quit the program currently running and launch the dictionary just to look up a word. If you are working under Multi-Finder, you can run the dictionary as well as other programs and switch between them. But since Webster's Ninth requires a remarkably greedy 770K, your Mac must have at least 2MB of RAM to be able to run it.

### Poorly Designed

The main window of Webster's Ninth is a two-column listing of the words—without definitions—in the currently selected dictionary (the main dictionary or any of the secondary dictionaries). You can thumb through the list page by page (as if browsing printed pages) in any of the dictionaries. You can also skip forward or back to the start of a specific letter in the main dictionary. Although the main window may be useful to browsers and encourage the kind of discoveries that often occur in print dictionaries, it is poorly designed: there is no indication anywhere of which dictionary is in view (you have to figure it out from the words in the list); the window itself cannot be moved, resized, or closed; you cannot skip to a specific letter in any of the secondary dictionaries, which makes word lists for these dictionaries difficult to flip through quickly; the biographical dictionary lists only last names; and in standard-size type (you can set the program to display all text windows in standard or large type) there's way too much wasted space.

The definitions themselves are stored in separate windows. To open a definition window, click on a word



in the main window or use the dictionary's Find command. It can search one or more dictionaries in a single sweep and can recognize irregular verb forms (it will tell you to look up *see* if you ask for *saw*, for example). But surprisingly, if you enter an incorrectly spelled word, and frequently if you ask for a regular verb form such as *searched* instead of *search* or the plural form of a noun, Webster's Ninth won't even hazard a guess. Instead, it merely scrolls to the word-list page containing the closest match and leaves the rest up to you. Also, the Find command searches only for words in the main word-list window; it won't search for words contained within a definition (such as all entries with *success* in the definition) or for etymology (such as all words based on *machina*).

When a definition window opens, the Mac plays the recorded pronunciation. If a table or illustration is connected to the entry, separate windows for these open as well. Illustration and table windows can be resized; but when you zoom in on them, they fill the entire screen and cover the definition window).

You can click on any word in a definition and use the Find command to open its definition window (see "The Definition Window"). Also, you can copy and paste any illustration and part or all of a definition into another application (a copyright notice is added automatically where you paste). However, you can open only one definition window at a time, and although you can easily move to the next or previous definition in the word list, there's no trail to take you back through previously opened definition windows.

You access the many explanatory sections in Webster's Ninth via the Reference menu (and its rather daunting array of submenus and subsubmenus, each of which is displayed in a separate window). Reference-section windows are not resizable, however, and since the scroll bars in both reference and definition windows do not operate correctly, you can scroll only line by line, not page by page.

### Reference Toll

All told, I found Webster's Ninth to be a significant disappointment. After all, the print edition costs less than one-tenth the price of the CD ROM version, contains the same text, tables, and graphics, is highly portable, doesn't require electricity, a Mac, or a CD ROM player, and can always be used with my word processor. Against these indisputable advantages, the CD ROM version must offer significant benefits of its own.

The recorded pronunciations clearly distinguish the CD ROM from the print version, but they are not, for me at any rate, anywhere near enough. And not only does Webster's Ninth not offer other major advances over the print edition, it doesn't even have features typically found in less expensive, more modest programs, such as resizable windows, efficient use of RAM, a well-designed Mac interface, and the ability to work within word processors and guess misspelled words. Until its many deficiencies are rectified, I'll save my money and continue to wait, either for a significantly improved Webster's Ninth or for the CD ROM version of the Oxford English Dictionary.—Robert C. Eckhardt

See Where to Buy or circle 870 on reader service card.

### The Definition Window

A definition window in Webster's Ninth opens atop the main word list. Definition windows are relatively narrow and, frustratingly, cannot be resized; you must scroll long definitions to see them in their entirety.





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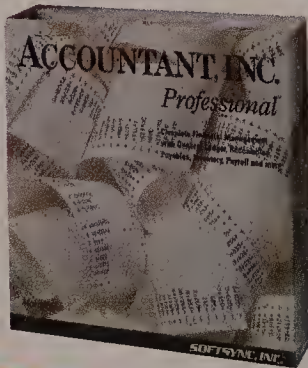
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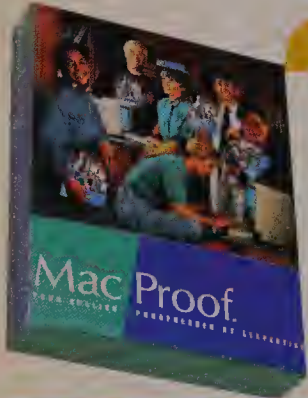
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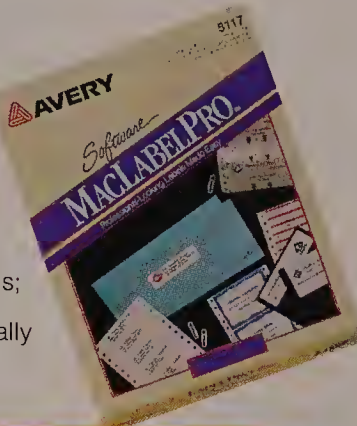
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(Avery)

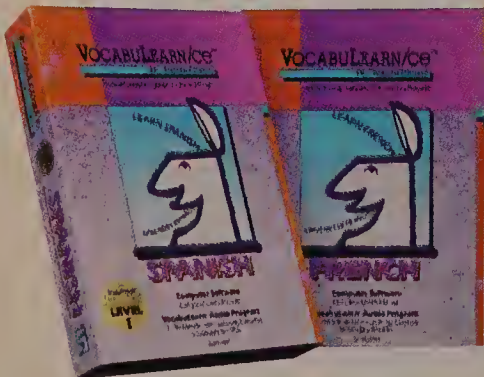
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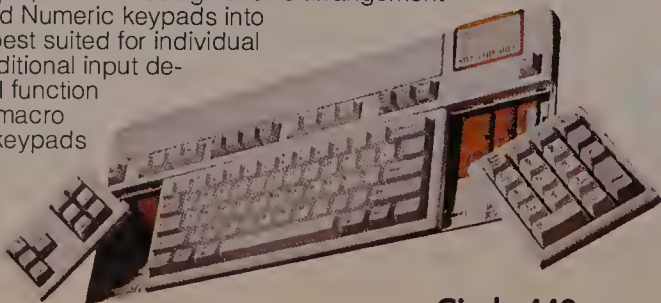
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Welltris	\$19

### XOR Corporation

MacGolf Classic	\$51
NFL Challenge	\$53
Road Racer	\$37
TaskMaker	\$26

## GRAPHICS AND DESIGN SOFTWARE

### Adobe Systems, Inc.

Adobe Type Manager 2.0	\$55
Adobe Plus Pack	\$108
Adobe Type Set 1 or 2	\$58
Adobe Type Reunion	\$38
Illustrator 3.0	\$357
Photoshop	\$499
Smart 1, II, III or IV	each \$83
Streamline	\$224
TypeAlign	\$57
Aldus	
Freehand 2.0	\$328
PageMaker 4.0	\$499
Persuasion 2.0	\$328
Altsys	
Art Importer	\$89





# WINDOW SHOPPING

by Lawrence Stevens

This month I review three programs that can lighten teachers' administrative duties

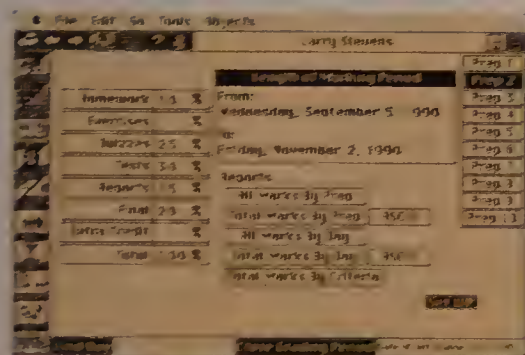
## EPS Teacher's Assistant 1.1

During my ten years of teaching, the complaint I heard most frequently from colleagues, besides the antics of the ubiquitous class clown, was about the torrent of paperwork. Teachers typically do not relish entering grades, completing incident reports, keeping attendance logs, or typing formalized lesson plans.

EPS Teacher's Assistant (\$99 from Executive Productivity Systems) is a lush set of HyperCard stacks that can lighten the teacher's administrative duties. It has calendars, a memo editor, student record cards, grade and attendance sheets, and an incoming and outgoing telephone log.

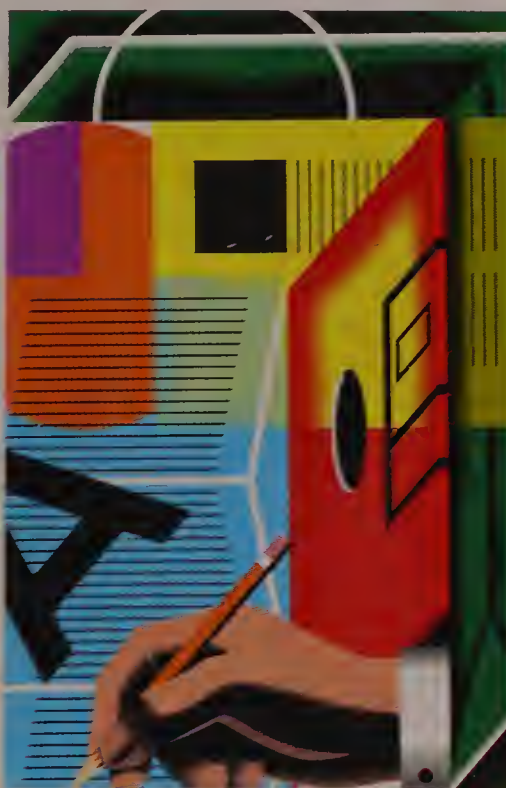
When the individual modules of EPS Teacher's Assistant are compared to stand-alone applications that perform the same functions, Teacher's Assistant unfortunately falls a bit short. However, the wide range of applications and, more important, the ability to automatically distribute data through those applications, brings this program to the head of the class.

Appointment listings in EPS



## Incremental Grading

The Marks stack of EPS Teacher's Assistant lets you specify the weight of each assignment in determining the final grade. The Prep buttons allow you to assign different weights for each of your classes.



HON CHAN

Teacher's Assistant can be automatically transferred among the daily, weekly, and monthly calendars; and to-do items can be carried over to future dates. If you can cajole your school secretary into providing the year's events—marking periods, school trips, and so on—in ASCII form, you can paste the data into a Dateplacer field. Then click on the Distribute the Dates button, and all the events are posted to the correct day.

The Classlist stack contains student records, including name, address, emergency telephone numbers, room number, and ethnicity. Aside from the fact that you can sort the student records in different ways, there is nothing remarkable about the Classlist stack in itself. What is remarkable is that you can transfer information from any other stack in EPS Teacher's Assistant into the Record of Contacts, a scrollable field on each student's Classlist card. So if you use the Phone stack to record a call to a student's parent

or the Marks stack to record a grade, all the information can be transferred to the student's Classlist card with a few mouse-clicks (see "Incremental Grading").

EPS gives you a wonderful smorgasbord but, like most all-in-one specials, only if you use all the modules. If you need no more than one or two modules and you're not interested in the ability to transfer data, you will be better off with a dedicated grading, calendar, or database application that will probably have more features, be more flexible, and will certainly run faster. (Like most HyperCard applications, EPS School Assistant is slow.)

On the other hand, once you've taken the time to set up this program, it runs like a dream. If your school has yet to relieve you of administrative duties, and if you have a Mac in your office, EPS Teacher's Assistant can greatly lighten your load.

## Grade Machine 3.0

If your administrative duties are not broad enough for you to need EPS Teacher's Assistant or if you want a more powerful tool for computing and storing students' grades, there's Grade Machine (\$49.95 from Misty City Software).

Grade Machine makes grading and attendance record keeping relatively painless by figuring averages, entering comments in reports to students, and translating numeric averages to letter equivalents.

Most of your administrative work is done at the beginning of the semester. You specify the relative weight of each assignment, the number of assignments in each grading period, and the format of reports.

Grade Machine consists of four windows: Scores, Assignments, Students, and Summary. You spend most (continues)



Assignments (Introduction to Data Processing)					
Categories:		1 Final Exam (30%)			
2 Weekly Quizzes (20%)		3 Class Reports (10%)			
4 Lab (25%)		5 Mid-Term Exam (15%)			
Friday Quiz (9/14)					
#	Assignment	Pts Poss	Weight	Adjusted	Category
1	Friday Quiz (9/14)	8	12.500	100	2
2	Friday Quiz (9/21)	12	8.333	100	2
3	Friday Quiz (9/28)	11	9.091	100	2
4	Friday Quiz (10/5)	13	7.692	100	2
5	Lab Report #1	55	1.818	100	4
6	Friday Quiz (10/12)	11	9.091	100	2
7	Friday Quiz (10/19)	19	5.263	100	2
8	Friday Quiz (10/26)	15	6.667	100	2
9	Class Report #1	4	25.000	100	3
10	Friday Quiz (11/2)	11	9.091	100	2
11	Mid-Term Exam	100	1.000	100	5

### Tracking Assignments

In Grade Machine all your assignments are listed. The Points Possible column contains the highest number of correct answers. You can type the maximum adjusted score (often 100 percent) into the Adjusted column. The Weight column contains the figure—either entered by you or entered automatically by the program—used to figure the Adjusted score.

of your beginning planning time in the Assignments window (see “Tracking Assignments”). For each assignment or test you specify the maximum raw score (total number of correct answers) and how the score should be translated into a percentage score. You enter the students’ raw scores in the Scores window. The program then calculates the percentage score and the student’s class average.

You can also designate up to five categories of assignments, such as lab work, homework, or quiz, and indicate the weight each assignment has in determining the final grade.

The Students window is your roster. You identify each student both by name and confidential ID name or number. The ID allows you to post class reports on a bulletin board and maintain students’ anonymity.

The Summary window lists all students, their total averages, averages by category of assignment, and students’ letter grades.

My only complaint is that although Grade Machine is set up in rows and columns, it lacks rudimentary spreadsheet editing functions such as fill down or copy and paste. And its limited use of Undo can be maddening.

Still, Grade Machine is much better at maintaining grades than EPS Teacher’s Assistant. Teacher’s Assistant doesn’t translate raw scores and will only tally up averages from seven assignments or tests. Grade Machine tracks an unlimited number of scores.

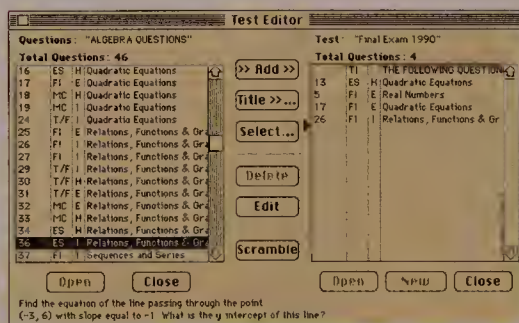
Schools vary in the amount of

responsibilities teachers must carry. If you attend committee meetings, make frequent calls to parents, constantly run to the office to look up student records, and have trouble organizing your lesson plans, you should buy EPS Teacher’s Assistant. If, on the other hand, your heaviest responsibility is grading tests and tallying averages, Grade Machine is your best bet.

### MakeTest 1.1.1

MakeTest (\$149 from Mountain Lake Software) won’t eliminate the need to type test questions, although it does help with formatting multiple-choice and true-or-false questions. Its main advantage is that once your questions are typed, you can easily find, select, and place them into any test.

You enter all the test questions in the Question Editor, which contains two fields, a Question Panel and an Answer Panel. You can either type or paste in text and graphics into the Question Panel. If a question is multiple choice, the Answer Panel displays as many alphabetically labeled check boxes as you specify. You type the answer next to each box, signifying the correct response by clicking on the appropriate box. The Answer Panel for true-or-false questions displays two check boxes labeled True and False; you indicate the answer by selecting one. The Answer Panel for other types of questions allows you to type the correct answer in paragraph form.



### Creating a Test

MakeTest’s Test Editor lets you craft a test by clicking on questions. The Question Panel, at left, lists all questions in the Question file. The Add button adds the selected question to the test, which appears in the Test Panel at right. The Title button takes you to a field where you can enter and edit test headings or instructions. The Scramble button rearranges the test questions in random order. The Select button causes the program to choose random questions based on your parameters.

Using pop-up menus, you specify a topic (you can define as many topics as you want), type (fill-in, essay, true-or-false, or multiple choice), and difficulty (easy, intermediate, or hard) for each question.

Your questions are stored in a Question file. To make a test, you simply select questions from this file using the Test editor screen (see “Creating a Test”). The left side of the Test Editor screen contains the first few words of each of your test questions in a scrollable list. When you select a question by clicking on it, most or all of the text appears at the bottom of the screen.

To include a question in your test, select Add. The question then appears on the right side of the Test Editor screen. Alternatively, MakeTest can randomly select any number of questions for you, by type, difficulty and topic.

The biggest shortcoming of MakeTest is that you cannot see how the printed test will look. You only see a tiny scrollable panel that lists the questions you’ve selected along with the first few words of any headings or instructions. So if you’ve formatted the test using various fonts and alignments on different sections, you’ll have to print out a hard copy to see how the test looks. It’s a shame that such a good program lacks a WYSIWYG interface.

Still, MakeTest provides the best way I have seen to store and categorize test questions. Of course, if you already have a lot of questions in a word processor file, it can take a long time to copy and paste them into MakeTest. An importing capability would be a nice addition. But after the input is finished, creating new tests can be almost as easy as choosing team members in a school-yard softball game.

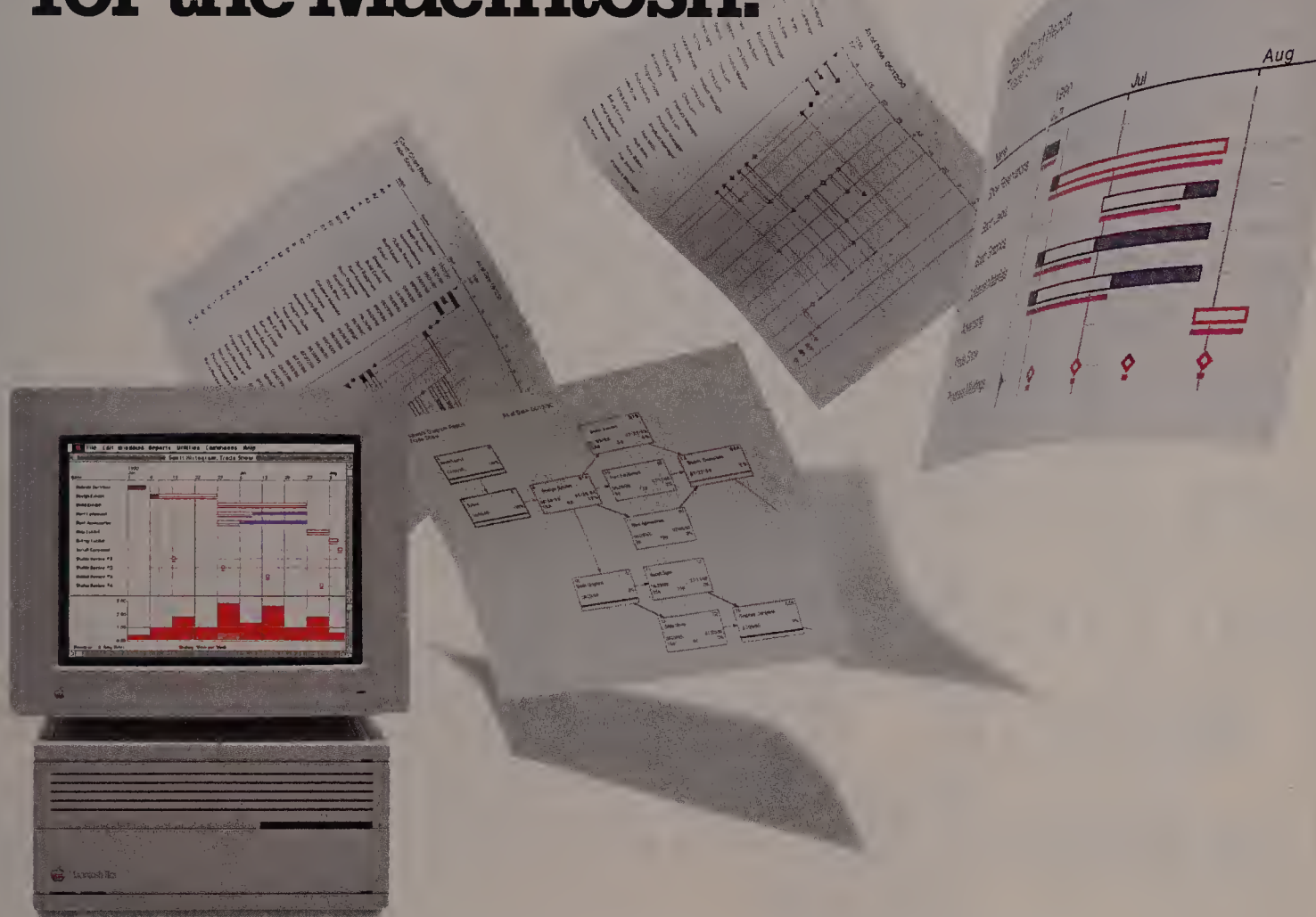
With MakeTest and either EPS Teacher’s Assistant or Grade Machine, most of your nonpedagogical duties will be automated. Your paperwork time will be reduced, and you’ll have more energy to devote to being creative and more patience in dealing with the ubiquitous class clown. ■

See Where to Buy or circle 740 (EPS Teacher’s Assistant), 747 (Grade Machine), 811 (MakeTest) on reader service card.



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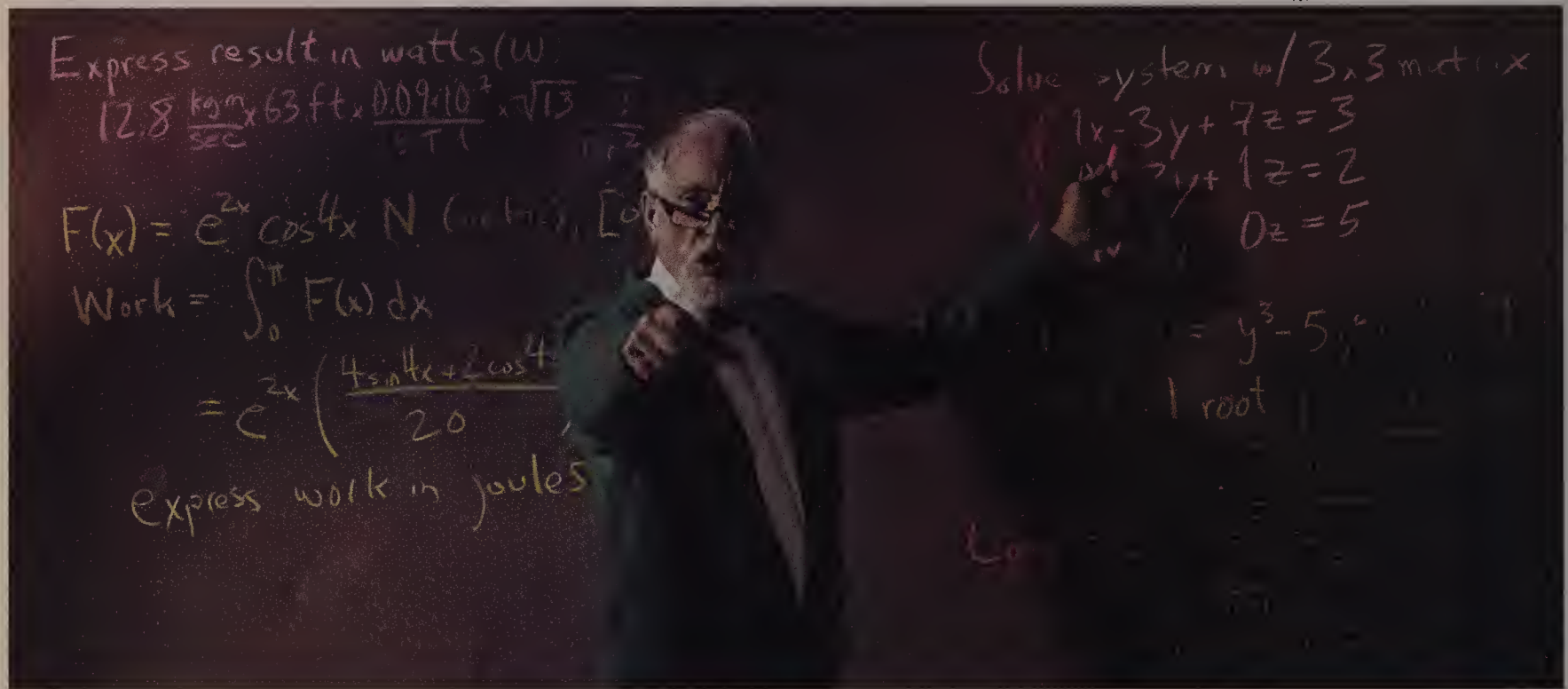
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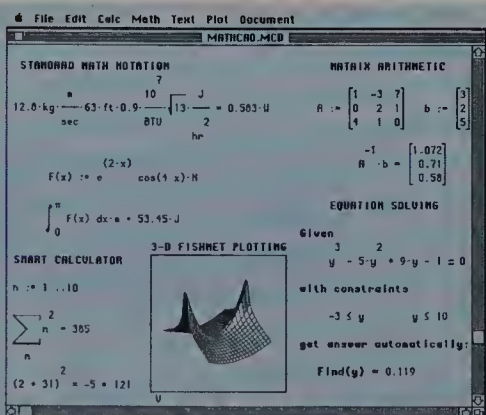


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# NEW PRODUCTS

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

## HARDWARE

### 96E4 Mac-Pac

Modem package that consists of the Anchor 96E4 9600-bps modem, Mac interconnecting cable, and Quick Link II communications software. Compatible with all modems that use the CCITT V.32 full-duplex protocol. \$995. Anchor Automation, 818/998-6100.



400 DPI Grayscale Scanner

### 400 DPI Grayscale Scanner

Mac-compatible 400-dpi gray-scale hand-held scanner with a scan width of 4<sup>1</sup>/<sub>10</sub> inches and can scan a page 14 inches long. Scanner has built-in window for visual scan alignment and has multiple rollers for one-pass scanning accuracy at a scan speed of 1 inch per second. 1MB min. memory. With SCSI controller \$599; with NuBus controller

\$499. Asuka Technologies, 714/757-1212.

### Access 650 WORM Subsystem

Laser Magnetic Storage WORM drive that comes complete with driver software, cables, and documentation. Uses a 654MB double-sided removable 5<sup>1</sup>/<sub>4</sub>-inch cartridge and a SCSI interface. Has 75-millisecond average access time, and a 600K/second-user throughput. \$2995. Optical Access International, 617/935-2679.



Access 650 WORM Subsystem

### CAMM-1 Desktop Sign Maker

Peripheral designed for the vinyl sign-making industry. Supports all Mac models and peripherals: supports graphics and text software such as Adobe Illustrator, Adobe Streamline, Aldus FreeHand, Letraset's LetraStudio, and Brøderbund's TypeStyler. Also supports EPSI to convert PostScript format to HPGL-format for output. Enables sign to be displayed on the monitor before printing. \$4495. Roland Digital Group, 714/975-0560.

### Color Presentation System

Bundled system that includes a Sharp JX-730 color

ink-jet printer, automatic cut-sheet feeder, Chooser-level driver, and JFT Paralink interface. \$2395. Sharp Electronics, 201/529-9500, 800/223-2121.

### ColorSpace Plus/SE

Multimedia system for the Mac Plus and SE. Proprietary keying technology overlays black-and-white Mac-created text or graphics in color on full-motion, full-color, live or recorded composite NTSC or S-Video output. Also supports a variety of output modes user-selectable from front panel switches or through software. \$1895; adapter cable \$100. Mass Microsystems, 408/522-1200.



DSP and Data Acquisition Card

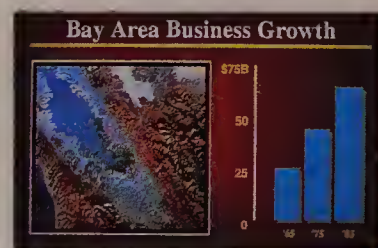
### DSP and Data Acquisition Card for the SE/30

Self-contained data-acquisition board for the SE/30. Includes a floating-point DSP chip. Runs at 32 MFLOPS and can do a 1024-point FFT (fast Fourier transform) in 2 milliseconds. \$2695. Spectral Innovations, 408/727-1314.

### FilmPrinter Turbo

Slidemaker that can produce 36 slides from Mac

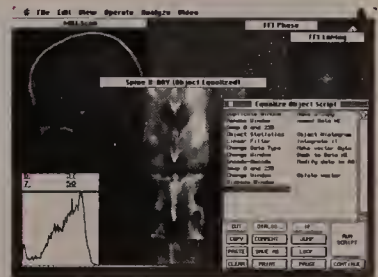
screen images in about one hour. Prints each pixel with 36-bit color resolution and supports the Mac and IBM PC-compatible platforms when used with the appropriate MirusImage accessory software package. \$7995. Mirus, 408/944-9770.



FilmPrinter Turbo slide

### ImageScript and 4IIP Memory

Upgrade boards that enable the LaserJet IIP to do PostScript printing. ImageScript requires 1.5MB of RAM to operate. 4IIP Memory additions include a 1MB RAM board. 4IIP Memory \$349; ImageScript \$595. PCPI, 213/670-5606.



IPLab Image Grabber System output

### IPLab Image Grabber System

Image processing system that includes a Neotech Image Grabber NuBus board bundled with IPLab image processing software, and technical support service. Images digitized with the system can be ex-

(continues)





changed with minicomputers and mainframes without translation. Supports standard NTSC and European PAL video standards. 2MB min. memory. \$2099. Signal-Analytics, 703/281-3277.

#### **KX-P 4455 Laser Partner**

11-pages-per-minute Adobe PostScript laser printer. Has dual paper bins that hold 250 sheets each. Includes 39 fonts, HP Series II emulation. Comes with 2MB RAM, expandable to 4MB. \$3495. Panasonic Communications and Systems Company, 800/742-8086.

#### **LView Multi-Mode**

19-inch monochrome display system that offers a choice of six different resolutions: 120, 92, 72, 60, 46, and 36 dpi. Has refresh rates of up to 92Hz. Utilities software comes with pop-up menus, screen cap-

ture, enlarged menu bar, multiple cursor sizes, and a screen saver. \$1999. Sigma Designs, 415/770-0100.



**LView Multi-Mode**

#### **MacPacq Model MP100**

Laboratory data-acquisition and control system for the Mac that is designed to replace strip-chart recorders, tape-based data loggers, and oscilloscopes. Can simultaneously record from 16 analog and 16 digital channels. Bundled with software driver and HyperCard interface. \$2295. Biopac Systems, 805/967-6615.



**MacPacq Model MP100**

#### **Mobius One Page Display**

Full-page-size display for use with the SE that contains an accelerator board that doubles the speed of a standard SE. Supports dual screen use so the SE screen can be used to hold desk accessories, open multiple documents, or display tool palettes while you work on the One Page Display. \$795. Mobius Technologies, 415/654-0556.

#### **The MousePen/ADB Version**

Mouse-like input device that is shaped like a pen. Designed for graphics-intensive applications such as freehand drawing, CAD, and desktop publishing.

Adjusts automatically from 100 to 1000 cpi (counts per inch). Operates at a variety of angles. \$99. International Machine Control Systems, 805/239-8976.



**The MousePen/ADB Version**

#### **NuCarrier System**

Data-acquisition system for the Mac II based on the modular I/O concept. Plugs in to a NuBus slot in the Mac. Standard on-board capabilities include 16 single-ended or 8 differential analog-input channels with 12-bit resolution at sampling rates up to 70kHz; 16 digital I/O channels; two in-

# HP offers you the best things next

From input to output, Hewlett-Packard leads the way. With a full line of Mac-compatible printer and scanner choices.

For photographic-quality scanning, there's the HP ScanJet Plus scanner. Combine that with one of HP's high-quality printers. The DeskWriter, the new LaserJet III, the LaserJet IIP, or the LaserJet IID. HP even has color printers. The PaintJet and the PaintWriter XL.

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dependent counters/timers; and a burst generator. \$995. Intelligent Instrumentation, 602/624-2434.



**NuCarrier System**

#### **Pacific MacPage**

PostScript emulation cartridge that can be inserted into the HP LaserJet printer to give it Macintosh PostScript compatibility. For HP LaserJet II \$795; for HP LaserJet IIP, IID, III \$599. Pacific Data Products, 619/552-0880.

#### **QuickImage 24**

NuBus frame-grabber board designed to capture an NTSC (or PAL) video frame in 1/30 second for use in

desktop publishing, technical documentation, creating published material from videotapes, or for creating special artwork effects. Accepts input from any composite or S-Video source. \$995. Mass Microsystems, 408/522-1200.

#### **REO-130 Optical Drive**

3 1/2-inch erasable optical drive with a 28-millisecond seek time. Holds 128MB of data and has a shelf life of 10 years. \$2995; cartridges \$129. Pinnacle Micro, 714/727-3300, 800/553-7070.

#### **SCSI Bus Multiplexers**

Multiplexer products for use with fault-tolerant and high-reliability computer configurations to switch between backup peripheral devices. Can also be used to connect up to 21 peripherals to a single SCSI initiator in applications such as

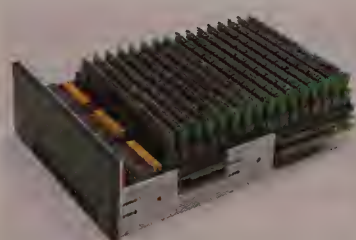


**REO-130 Optical Drive**

production testing, burn-in, process control, and robotics. SM-90/12 \$2480; SM-90/13 or SM-90/22 \$2840. Ancot, 415/363-0667.

#### **SCSI Dart**

RAM disk that contains an embedded SCSI controller and emulates a hard disk drive. Contains 32 slots for



**SCSI Dart**

memory expansion. Comes bundled with 2MB of RAM and a UPS battery backup system. Average seek time is under 0.1 millisecond using standard hard disk tests. Unit has no moving parts. \$3395. Newer Technology, 316/685-4904.

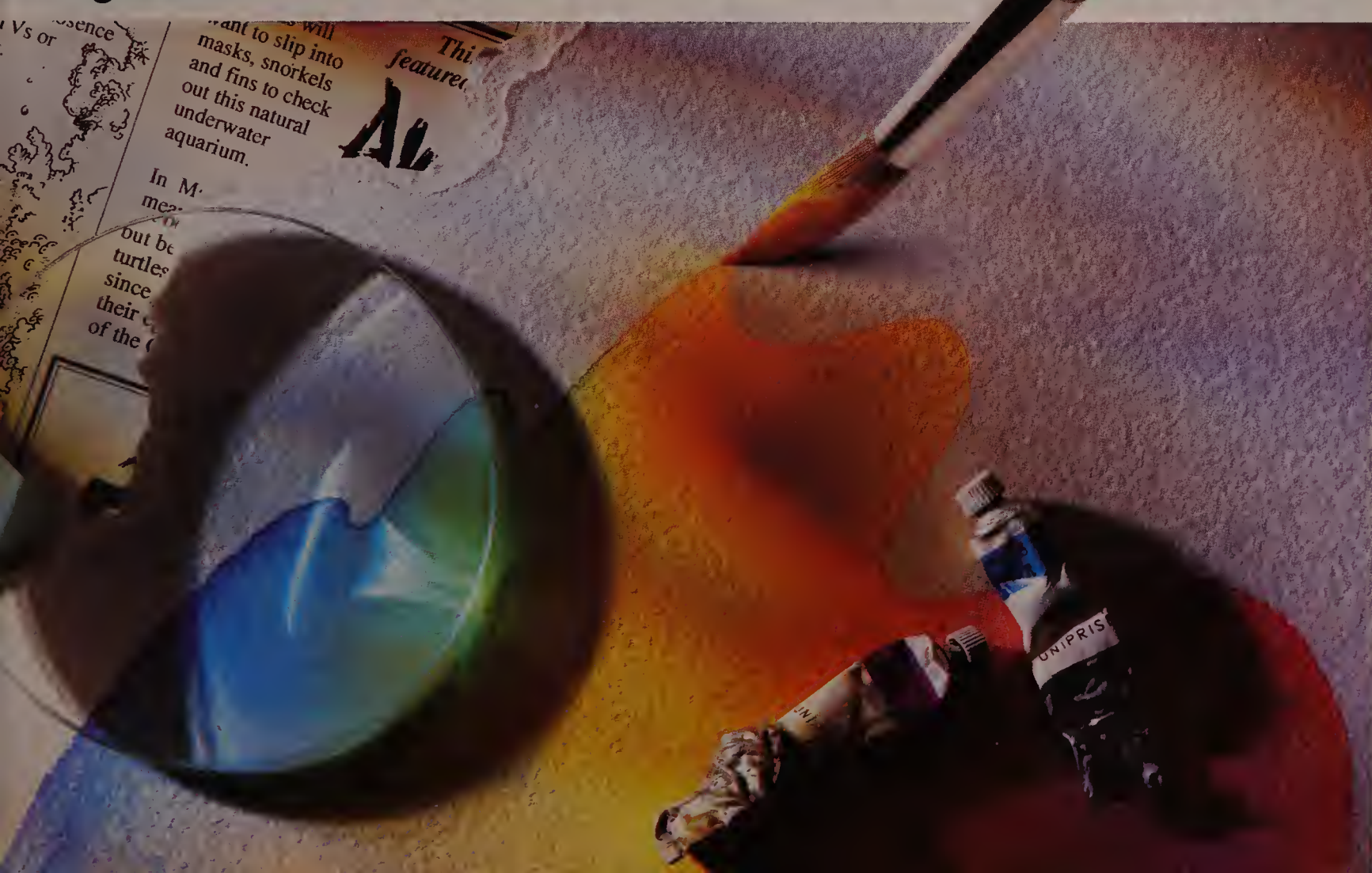
#### **UltraDrive 430S and 430Si**

430MB external and internal drives that use the Seagate Wren VI half-height drive mechanisms. Capable of 16-millisecond average access time, GCC UltraWare disk software, GCC Partitions, QuickSpool II, and QuickEnvelope. External \$2699; internal \$2549. GCC Technologies, 800/422-7777.

#### **VGA Monitor**

14-inch VGA-resolution monitor with 31.5 and 35.5kHz horizontal scan (continues)

# to your Macintosh.





frequencies and a 45MHz video bandwidth. Compatible with the Mac and IBM PC compatibles. \$599. Power II Technologies, 213/697-3969.

## SOFTWARE

**3D Modeler**

Three-dimensional modeling program that enables free-form modeling with handles for editing curves and surfaces, creating smooth surfaces across various cross sections, extruding and lathing at any angle, and autosurfacing with options for handling holes. 1MB min. memory. \$595. Visual Information Development, 818/918-8834.

**3D Producer**

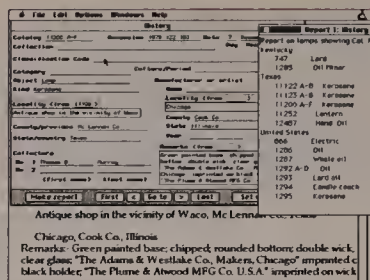
Animation software that is compatible with modeling programs such as Super3D, AutoCAD, MacBravo, and

**3D Producer**

Dimensions 3D Modeler. Animation spreadsheet allows frame-by-frame control of objects, light sources, and cameras. 1MB min. memory. \$695. Visual Information Development, 818/918-8834.

**Accession**

Software for managing museum collections. Organizes catalog entries, accession and donor information, and additional non-archival data. Versions are available for history, natural history, archaeology, geology, and other disci-

**Accession**

plines. 1MB min. memory. \$795; contact vendor for site license. Oak Tree Software, 407/339-5855.

**CGM/Pro**

Software system developed to help corporate users manage cross-functional management programs for employees. Lets the user draw process-flow diagrams that include tasks, meetings, reports, decisions, and milestones. 1MB min. memory. \$2495. TSG, 617/497-0423.

**ClickArt Animals & Nature**

Collection of more than 150

PostScript images of animals and nature: insects, dinosaurs, exotic animals, farm animals, the earth and solar system, weather and seasons, trees and plants, flowers and grains, and borders and dingbats. 1MB min. memory. \$129.95. T/Maker, 415/962-0195.

**Color MacCheese**

32-bit paint application includes antialiasing, a Translucent Paint feature that lets you set the level of paint transparency, an interactive help function, linear and radial gradient fills, and customizable color patterns. Lets you use 32-bit color with an 8-bit video board. 1MB min. memory. \$99. Delta Tao, 408/730-9336.

**The Computer Glossary**

Computer glossary that defines over 4000 terms for novice computer users.

# Pigments for your imagination

**HP color printers let you draw splashy color from your Macintosh.**

Entertain your thoughts with HP's PaintJet and PaintWriter XL color printers. Both are fully Mac-compatible and let you use all Quickdraw-based software applications. That means high-quality Macintosh II output in 16.7 million colors.

Print on paper or transparencies with 13 scalable outline fonts. And for shared use, the PaintWriter XL offers AppleTalk, faster speed, and auto sheet feed. For sample output and the name of your authorized HP dealer, call 1-800-752-0900, Ext. 1167.

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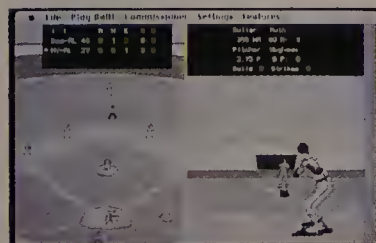




Covers personal computing, computer graphics, LANS, and DTP. 1MB min. memory. \$59.95. The Computer Language Company, 215/297-5999.

### Earl Weaver Baseball

Baseball-simulation game with two levels of play, Arcade and Strategic. Arcade mode uses graphics and digitized sound to evoke the sense of an actual ball game. Strategic level enables the player to act as team manager, keeping tabs on injuries, setting pitching rotations, and monitoring the accumulated stats using a built-in compiler. Coau-



Earl Weaver Baseball

thored by Earl Weaver, former manager of the Baltimore Orioles. 1MB min. memory. \$49.95. Electronic Arts, 415/571-7171.

### Flostat

Entry-level statistical-analysis mapping and graphics software, capable of linking data to maps or exporting tables and graphs to page-layout software. 1MB min. memory. \$99. PSRC Software, 419/372-8648.

### Fontina

Application that displays a multicolumn menu for fonts installed in the System, and groups related typefaces where possible. 512KE min. memory. \$69.95; 10-pack \$295. Eastgate Systems, 617/924-9044, 800/562-1638.

### Ghoster

Application to produce



Ghoster

electronic screen tints in 10 percent gradients for desktop-published documents. Output prints on any PostScript printer. Tint screens are printed in position for black and color-separated images. 1MB min. memory. \$29. Sparkle, 619/455-7048.

### If:8 Forms Designer

Forms-design package. Forms structure consists of cells that automatically stretch or shrink to accommodate text input. 1MB

min. memory. \$279. Soft-View, 805/385-5000.

### Informed Mini-Manager

Application for filling in forms created with Shana Corporation's Informed Designer. User creates forms with Informed Designer and can fill them in with the information database provided by Informed Mini-Manager. Database supports searching from any field and has multiple printing options. 1MB min. memory. \$99. Shana Corporation, 403/453-3330.

### Jack Nicklaus' Greatest 18 Holes of Major Championship Golf

Golf-simulation game that features 18 holes from courses where the four major championships have been contested. User plays against image of Jack Nicklaus. (continues)

*The PaintJet with  
Macintosh interface.*  
\$1,520\*

*The PaintWriter XL  
designed for shared use.*  
\$2995\*

\*Suggested U.S. list prices. © 1990 Hewlett-Packard Company PE12009





laus that possesses skills patterned after his own game. User chooses Skins scoring or Stroke play. Has beginner and expert level. 1MB min. memory. \$59.95. Accolade, 408/985-1700.

### Jack Nicklaus Presents the Greatest Championship Courses of 1989

Add-on course disk to Jack Nicklaus' Greatest 18 Holes of Major Championship Golf program. Game simulates the greatest golf courses played in 1989 including those used for the U.S. Open, the PGA, and



Jack Nicklaus' Greatest 18 Holes of Major Championship Golf

the British Open. 1MB min. memory. \$21.95. Accolade, 408/985-1700.

### Jack Nicklaus Presents the International Course Disk

Add-on to Jack Nicklaus' Greatest 18 Holes of Major Championship Golf. Simulates three internationally known golf courses: one in Japan, one in Australia, and one in England. 1MB min. memory. \$21.95. Accolade, 408/985-1700.

### Learn to Speak English

HyperCard-based English-language tutorial. Includes 36 HyperCard lessons, interactive drills for English grammar, a grammar reference, and cultural notes about life in America. Four native speakers of English read dialogues either on CD or audiotape. Available in CD ROM, audio CD, and cassette versions. 1MB min.

memory. CD ROM \$249.95; audio CD with 15 discs \$249.95; cassette with 15 discs \$149.95. The Hyper-Glot Software Company, 615/558-8270.

### List Learner

Application used to build lists of information on any subject and test recall of that information using flash-card or multiple-choice quizzing. 1MB min. memory. \$59.95. Selective Memory, 408/371-5595.

### Mac Headlines

Volumes of EPS or PICT format headlines. Can be used with word processor or desktop publishing program. Each volume has a selection of titles for holidays, business use, flyers, schools. 1MB min. memory. EPS \$19.95 per volume; PICT \$14.95. Asgard Software, 703/255-3085.

### Mac Wire Frame

3-D wire-frame editor. Objects can be moved, scaled, rotated, and viewed from various angles. Includes a developer's toolbox with complete Pascal source code; data types; procedures and functions used to create the editor program; and the source code used to create the editor program itself. 2MB min. memory. \$499.95. Amplified Intelligence, 916/737-1550.

### MacMatrix

Software driver for Toshiba's 24-pin letter-quality printers. Kit includes disk, manual, and cable to interface Mac Plus or later model with a Toshiba SL printer. 1MB min. memory. \$49. Toshiba, 714/583-3000.

### MailMaker

Local-area mail utility that lets electronic mail users


# With the HP DeskWriter, you can

## The Paradise Times

VOL. III      SPRING, 1990      WANDERING TOURS LTD.

For the traveler craving the tropical essence of the Yucatan as well as a dash of the good life, Akumal is the place. It's not the luxury class of Cancun, but it beats the pants off most other small resorts along the coast.

Akumal prides herself on the conspicuous absence of telephones, TVs or bustling activity.



Folks, this town is laid back. It offers a good selection of hotels, dining and activities to soothe frazzled city nerves.

A large barrier reef runs parallel to the Quintana Roo coast, protecting the lagoon from the open sea. Basically it creates a gigantic underwater playground, chock full of Caribbean underwater goodies which attract divers from all over the world.

For the archaeology buffs out there, Akumal is 15 km from Tulum. For the rest of us that means it's close to one of the few walled Mayan ruins. Xelha is another 5 km, and even the amateurs among us will want to slip into masks, snorkels and fins to check out this natural underwater aquarium.


In Mayan lingo, Akumal means "Place of the Turtle" not because it's so laid back, but because giant green turtles have come ashore since the dinosaur days to lay their eggs in the warm sands of the Caribbean.

Surrounding Akumal are lush jungles and thick coconut groves. Bright red bromeliads bloom high in the trees during early spring, sustaining themselves on rain, dew and humidity. While checking out bromeliads, you will probably see it's cousin, the orchid.

Along the pourous sand of the Akumal beaches, you'll find lots of really neat stuff: conch shells, lacy red seaweed, coconuts sprouted after soaking in the sea for months, and crabs of all sizes and colors.

This month's featured destination:

# Akumal



Relax amidst the long stretches of wind bent coconut trees which set off the blurring white sands of Akumal's sweeping beaches.





**MacMatrix**

send formatted faxes from their desks. Lets the user transmit files created in most Mac applications via data or fax modem. Available in Microsoft Mail and QuickMail versions. 1MB min. memory. Single user \$40; five-pack \$195; ten-pack \$345; twenty-pack \$595; fifty-pack \$1250. Solutions International, 802/658-5506.

#### **Music Mouse**

Application for creating music on the Mac. Supports MIDI and the Mac's internal sounds. 1MB min. memory. \$79. Dr. T's Music Software, 617/244-6954.

#### **NanoDisk**

Memory-enhancement software that comes bundled with 16MB or 32MB of Technology Works SIMM modules. System enables the Mac to access all available internal memory, expanding accessible memory to 32MB. 1MB min. memory. \$1995. The Technology Works, 512/794-8533.

#### **NeuralWorks Explorer**

Software tutorial that gives the novice user a method of learning neural-network theory as well as an environment in which to build practical applications. 2MB min. memory. \$199. NeuralWare, 412/787-8222.

#### **NeuralWorks Professional II**

Neural-network development environment for advanced technology groups and application developers within the neural-network

community. Designed for solving problems such as credit card fraud and for insurance underwriting and bond or stock portfolio management. InstaNet feature enables users to access another network from a user-configurable list. 2MB min. memory. \$1495. NeuralWare, 412/787-8222.

#### **On Location**

Desk accessory reduces the time it takes to find and view files. Indexes the name and text of files on any volume, and combines digital-signature compression technology, Claris/DataViz file translators for displaying text stores in most word processing formats, and automatic background indexing. \$129.95. On Technology, 617/224-2545.

#### **PlayMaker**

Football-simulation soft-

ware that re-creates the actions of an 11-man football squad with animated graphics. Allows you to assume the role of head coach and design custom plays and strategies for your team. Can be played individually or over a network. 512K min. memory. \$49.95. Brøderbund, 415/492-3200.

#### **QuickGIF Plus**

GIF decoder that runs three to four times faster than existing utilities and is able to play GIF animated images in real time. Program also has the ability to display PICT images (including 32-bit PICT files), MacPaint, and ReadMac (PC MacPaint) files. Enables the user to create a "slide show" of graphics and sound files within a folder. 1MB min. memory. \$30. AmariliSoft, 415/455-0424.

(continues)

# have it all. (But keep it to yourself.)



**The HP DeskWriter printer puts laser-quality printing right at your fingertips.**

With a small size and a \$995\* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and Apple Talk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

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**Recognize for the Macintosh**

OCR application compatible with Dest's PC Scan series of scanners, HP's ScanJet and ScanJet Plus, and the Apple Scanner. Combines omnifont recognition, full text-formatting control, and recognition across a wide range of type fonts. Implements Claris's document interchange standard XTND technology. 1MB min. memory. \$695. Dest, 408/436-2700.

**Reflection 2 Plus**

Mac-to-VAX terminal-emulation software that emulates VAX model VT320. Works with MultiFinder; comes with command language so users automate functions such as dialing in to hosts and transferring files between machines. 1MB min. memory. \$249. Walker, Richer & Quinn, 206/324-0350.

**ScrapMaster**

Application designed for the scrap-metal recycling industry. Provides a database to manage all aspects of a recycling business. Includes accounts receivable and accounts payable, general ledger, payroll, daily sell and buy reports. Database may be customized to suit a particular client's needs. 1MB min. memory. \$4000. Consolidated Resources, 301/907-6616, 301/796-9044, 800/262-6614.

**Shapes**

Add-on module for Letraset's ColorStudio that adds outline drawing and antialiased rendering tools to the paintbox capabilities of ColorStudio. Enables users to render any object or font as antialiased. 5MB min. memory. \$295. Letraset, 201/845-6100, 800/343-8973.

**Sound Manager Package**

Sound-management application that contains Sound Mover, which allows user to copy, remove, and edit sounds in the System or any other file; and SndControl, which lets you assign a different sound to the start-up beep (as well as to other actions such as disk eject, insert, restart, and shut down) from the Control Panel. 512KE min. memory. \$25. Riccardo Ettore, 67 rue de la Limite, 19970, W-Opem, Belgium.

**SpeedLink Ethernet Adapters**

Ethernet adapter for the Mac II, SE, and SE/30. Board plugs in to existing bus slots to provide transparent connectivity to existing networks using EtherTalk, DECnet, TCP/IP, and other protocols running over Ethernet. \$449. EMAC, 415/683-2222.

**StickyBusiness Plus**

Label-designing and -printing software that incorporates bar coding and postal formatting. Enables the user to create, position, size, and rotate bar codes; includes built-in address formats that meet all United States Postal Service standards for addressing business mail to be read and sorted by postal machinery. 1MB min. memory. \$170. Williams & Macias, 509/458-6312, 800/752-4400.

**Studio/32**

Color paint program that has all the features of Electronic Arts' Studio/8 and supports 1-, 4-, 8-, 16-, and 32-bit color. Includes a scanner utility; Pantone Matching System; four-color separation utility; three-dimensional perspective; file input and output for PICT, MacPaint, TIFF,

# With the HP ScanJet Plus, you've

## The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

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For all its amenities, ease of use, good image quality, and low price, *Publish!* recommends the HP ScanJet Plus as their "Best Buy."





**Studio/32**

and EPS files; and online help. Requires a 24- or 32-bit color video board for true color display. 2MB min. memory. \$695. Electronic Arts, 415/571-7171.

### StuffIt Deluxe

Enhanced version of the original StuffIt file-compression utility; includes the Magic Menu Finder Extension for point-and-click stuffing and unstuffing and for electronic mail transmission from the Finder. Has standard and expert operating modes. 1MB min. memory. \$99.95. Aladdin Systems, 408/685-9175.

### Swivel 3D Professional

3-D sculpting and animation program based on the Swivel 3D interface with increased capabilities such as new smooth shading using a proprietary version of the Phong system; environment mapping, which allows the user to bring in any PICT file as an environment map that can be used to create reflective textures; eight independent light sources of varying intensity. Has 24-bit color output to a full screen or a 24-bit PICT file; also has DXF and RenderMan output. 4MB min. memory. \$695. Paracomp, 415/543-3848.



**Swivel 3D Professional**

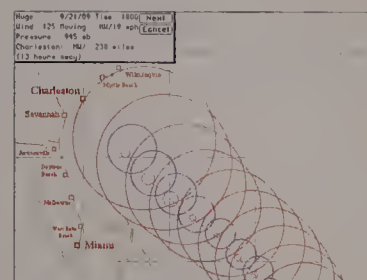
### Techbase

Relational database-management system that enables the user to generate maps that can be used to graphically differentiate geological formations, property ownership, and mineral bodies, through the use of patterns and colors. Also has an applications generator that lets the user construct a data-input screen designed to meet a prescribed format. 1MB min. memory. \$2030. Minesoft, 303/292-6449.

### TrakHur

Hurricane tracking system intended for tracking typhoons and hurricanes worldwide. Has more than 15 maps including the Atlantic and Pacific basins and surrounding coastal areas, Caribbean and Northwest Gulf areas, and others. User can input data as a storm is

TrakHur-Hugo89 PICT



**TrakHur**

brewing; program calculates number of hours it would take the storm to arrive at a specific location at its current speed. Also can be used to display tracks from past hurricanes. 512K min. memory. \$39.95. Hurricane Research Service, 512/836-7888.

### WPduet and 100duet

WPduet enables users to connect the Macintosh directly to the WP-2 Tandy portable word processor for the purpose of file transfers. Includes file translators that convert WP-2 documents (*continues*)

# got it made in the shades.





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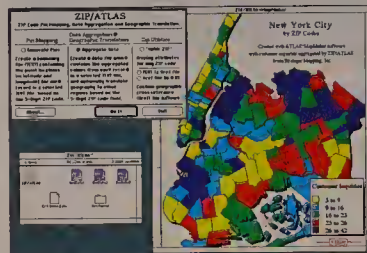
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directly into MacWrite II, Microsoft Rich Text Format, or ASCII files. 100duet performs the same functions for Connective to Tandy Model 100 and 102 laptop computers. 512K min. memory. \$99.95. Cabochon, 508/264-4648.

#### ZIP/Atlas

Desktop mapping utility converts any database or spreadsheet file containing zip codes into files that are compatible with Atlas Map-Maker software. Program can be used to map point locations of a name and address file, or to aggregate data by five-digit or three-digit zip-code areas, counties, states, or other areas. 1MB min. memory. \$195. Strategic Mapping, 408/985-7400.



ZIP/Atlas

#### ACCESSORIES

##### The Coach for PageMaker 4.0

Mouse pad with shortcuts and tips for using PageMaker 4.0. Has four areas of help: keyboard shortcuts, mouse shortcuts, typesetting hints, and general shortcuts. \$19.95 plus \$2 s/h. Binary Graphics, 206/447-0636.

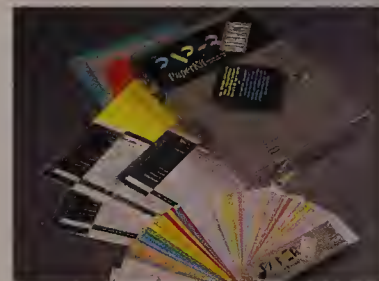


The Coach for PageMaker 4.0

##### Computer Clothes

Dustcovers for computers, printers, and peripheral

devices. Styles are available for the Mac Plus and SE, Apple Macintosh II 12" Monochrome Monitor, 13" Color Monitor, 15" Portrait, and Radius Full Page Display monitors, as well as Imagewriter II, LaserWriter II, and HP DeskWriter. Custom covers available. \$15.95 to \$32.95. Computer Clothes, 412/343-7787.



The PaperKit

##### The PaperKit

Collection of more than 150 8 1/2-by-11-inch sample papers that can be ordered through Paper Direct for use with typewriters or printers. Comes with The PaperSelector, a set of paper swatches that demonstrate the design and texture of all papers offered by Paper Direct. \$14.95. Paper Direct, 800/272-7377.

##### Rolodex Die Cut Cards

3-by-5-inch die-cut rotary-file cards that come on 8 1/2-by-11-inch white index stock sheets that can be manually fed into a laser printer. Package also includes a layout grid. 400-card package \$25.90. Intergraphix, 617/826-7733, 800/451-2515. **M**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number (and two copies of software) to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. We reserve the right to edit submissions.





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\*IID duplexing feature not supported in PostScript mode.

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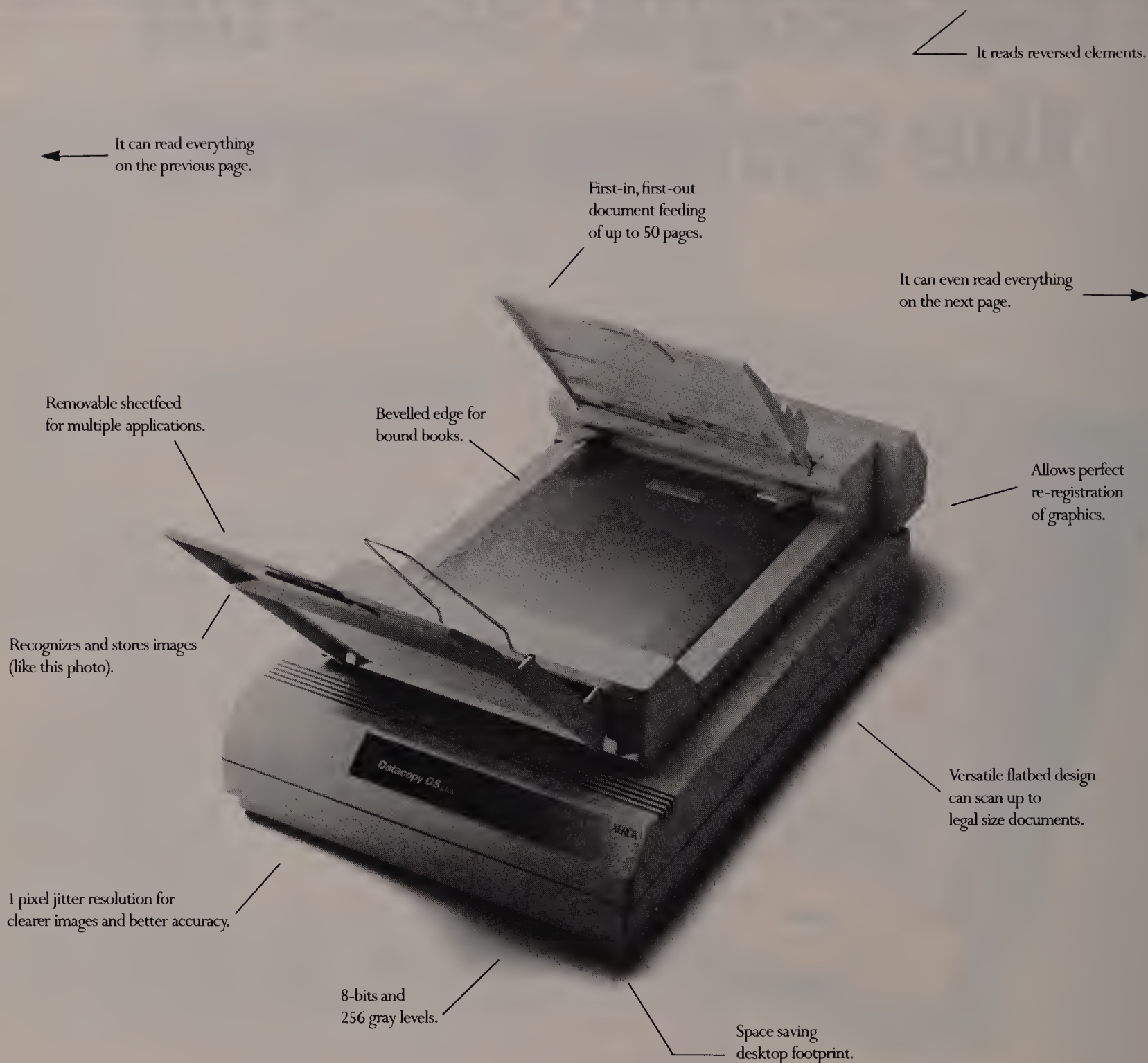
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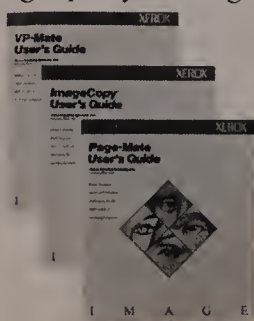
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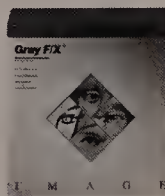
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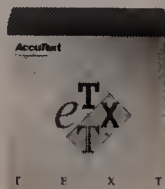
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# Quick Tips

FINDING MISSING DISK SPACE, ARRANGING PAMPHLET PAGES, HANDLING INCIDENTAL CHARGES, AND MORE

T

BY LON POOLE

he standard colors for the z-axis (height) of a 3-D surface or contour plot in Wingz are none too charming. A tip published here in April featured a Wingz script for converting the haphazard color scheme to a smooth gradation of gray shades.

Christopher Caswer of West Henrietta, New York, modified that script to produce smooth multicolor shading (see "Color Variations"). Colors range from dark blue for the lowest values on the z-axis to light blue, green, yellow, orange, and red (see "Color Shading"). Caswer also suggests turning on chart smoothing. First select the chart and choose the Chart Info command (Format menu). Then in the dialog box select the Smoothing option and enter the number of segments you want. Smoothing results in a smoother plot but one that takes longer to draw. The more segments you specify, the longer the drawing process. You can make Wingz stop redrawing at any time by pressing ⌘-. (period).

## RAM Advantages

Q My lab is purchasing a Mac IIci with 5MB of RAM. What are the advantages of all this memory? I know it will let me use MultiFinder, but what else can I do? What effect does increasing the RAM cache setting in the Control Panel have? I use Microsoft Word quite a bit. Should I increase the RAM cache and have the program loaded into memory?

Leonard Malkin  
Detroit, Michigan

A Unless you use only one application, I think you'll find the ability to run under MultiFinder a major

benefit. MultiFinder lets you have two or more programs open at once and switch instantly from one open program to another. This quick switching makes cutting and pasting between programs a snap. With MultiFinder active, the Finder remains open for tasks like naming and copying disks, folders, and files. You also get better memory management—fewer system crashes—with MultiFinder active.

With or without MultiFinder active, programs like ColorStudio, Illustrator 88, PhotoMac, Photoshop, and PixelPaint require 2MB to 4MB. These programs, as well as others with more modest memory requirements, take advantage of additional available memory to let you open more documents at once, to work on larger documents, or to do both. Programs that place few restrictions on the number of open documents may operate faster because more of the application and the open documents fit into memory simultaneously, reducing the need for disk accessing.

You can always use extra memory for system software enhancements besides MultiFinder. Adding goodies to the System Folder—Adobe Type Manager, After Dark, MasterJuggler, QuickMail, TOPS, Virtual, and so on—can easily increase system memory beyond 1MB. What's more, System 7.0 will require at least 2MB—double the minimum you need for System 6.0.5.



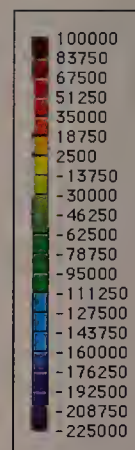
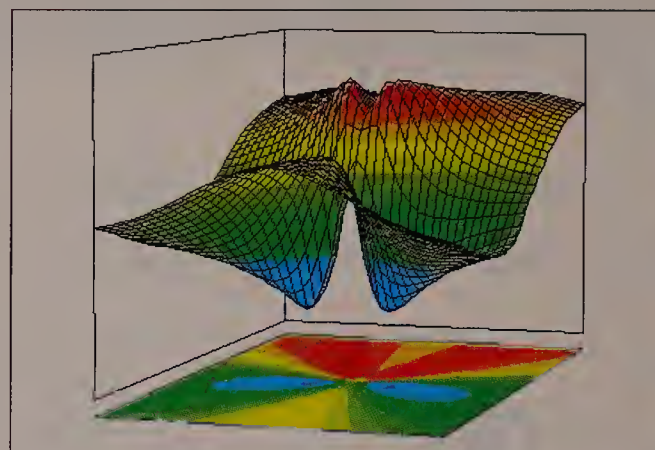
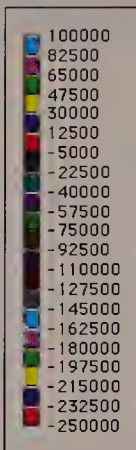
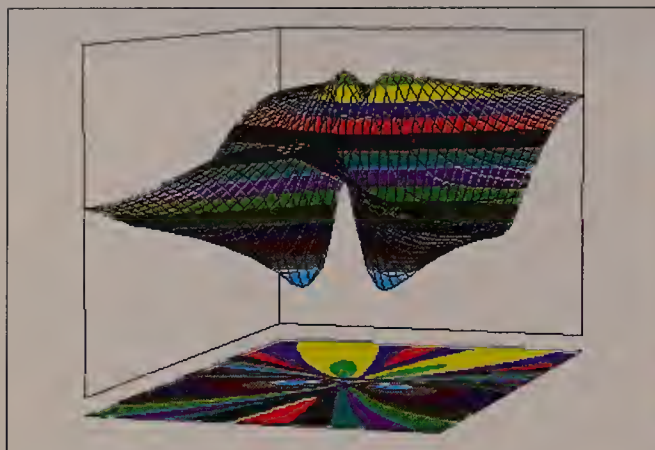
Turning on the Control Panel's RAM Cache option sets aside some RAM as a storage area for information recently retrieved from disk. If that information is needed again, it can be copied quickly from the RAM cache instead of more slowly from disk. A cache of moderate size, say 128K, speeds up program operation, though not dramatically. I have heard, but have been unable to substantiate, that a cache 256K or larger may actually slow down program operation. Some programs work as well or better with the RAM cache set to Off. HyperCard, for example, has its own cache and works faster when the Control Panel RAM Cache is set to Off.

Microsoft Word has its own special options for keeping the whole program, document, or both in memory. To set these options, use Word's Preferences command (Edit menu).

## Lost Space

Q Although my hard disk indicates it has 9945K in use, when I add up the space actually used by each file, (continues)





### Color Shading

Standard colors in Wingz surface and contour graphs don't provide useful shading information (left). Applying the script in "Color Variations" to those graphs achieves smooth color shading (right).

## COLOR VARIATIONS

This Wingz script applies smooth color shading to a surface or contour graph. The script remaps the z-axis to have 20 zones or divisions. Each zone is a slightly different color than the zones immediately above and below it. You can set any number of zones between 6 and 50 by editing the line **ZONE = 20**.

```
{Define the}
{variables needed}
{for the script}

{"chartnum" refers to}
{the selected chart}
DEFINE chartnum

{"min" and "max" are the}
{minimum and maximum}
{values on the Z-axis}
DEFINE min, max

{"Z" and "Z1" are}
{the current Z-axis}
{division and subdivision}
DEFINE Z, Z1

{"R,"G," and "B" are the}
{the red, green, and blue}
{color components for the}
{current Z-axis division}
DEFINE R, G, B

{"zones" is the number of}
{color zones (divisions)}
{on the Z-axis}
DEFINE zones
zones = 20

{"gain" is the amount to}
{change a color's intensity}
DEFINE gain
gain = 1275/zones/10

{prevent redrawing the}
{graph}
REPAINT OFF

{get the number of the}
{selected chart}
chartnum=number()

{select the Z-axis}
SELECT CHART
chartnum AXIS 3

{get the minimum and}
{maximum Z-axis values}
min=SCALEMINIMUM()
max=SCALEMAXIMUM()

{set Z-axis scaling and}
{number of major divisions}
MANUAL SCALING
FROM min TO max
WITH zones MAJOR AND
1 MINOR DIVISIONS

{initialize the color values}
R = 0
G = 0
B = 127.5

{loop through each color}
{zone (Z-axis division)}
FOR Z = 1 TO zones

{calculate the RGB values}
{for this zone}
CASE
WHEN Z + Z1 <= .1*zones
B = B + gain

WHEN Z + Z1 > .1*zones
AND Z + Z1 <= .3*zones
G = G + gain

WHEN Z + Z1 > .3*zones
AND Z + Z1 <= .5*zones
B = B - gain

WHEN Z + Z1 > .5*zones
AND Z + Z1 <= .7*zones
R = R + gain

WHEN Z + Z1 > .7*zones
AND Z + Z1 <= .9*zones
G = G - gain

WHEN Z + Z1 > .9*zones
R = R - gain
END CASE

{end subdivision loop}
END FOR

{select the zone (the}
{Z-axis division)}
SELECT CHART chartnum
SERIES Z

{set the zone's color}
FILL FG RGB (R,G,B)

{end zone (division) loop}
END FOR

{minimize chart redrawing}
SELECT CHART chartnum

{now redraw the chart}
REPAINT OBJECTS
```

the total is only 8661K. Where is the unaccounted for 1284K?

Fred Schreiber  
Riverdale, New York

**A** Your disk may have a bloated Desktop file. That file, whose icon is invisible, records copies of icon images for most applications and docu-

ments, Get Info comments, and other information for the Finder. The Desktop file initially occupies 6.5K on an (continues)



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TECHNO-FILE**

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**BY JACK LESAR, UNITED PRESS INT'L**

"White Knight is one of the best values in communications software, and with Okyto thrown in (a \$39.95 value when purchased separately), it's an even better bargain. White Knight continues the tradition of supporting every possible feature that its users could want and then some and with RCMDs you can add features even Scott Watson couldn't think of."

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**COMPUTER SHOPPER**

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**MACWORLD MAGAZINE**

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**MacWEEK**

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### QUICK TIPS HOW TO

800K disk, 11.5K on a blank 1440K floppy disk, 32K on a blank 45MB hard disk, and so on. Not surprisingly, a disk's Desktop file grows if you add lots of files to the disk. However, an enlarged Desktop file does not shrink when you remove files. Icons belonging to deleted files may needlessly enlarge the Desktop file.

You can reduce a disk's Desktop file to its minimum size by pressing the  $\mathbb{H}$  and Option keys before the disk's icon appears on the desktop. That occurs when starting up, when quitting a program with MultiFinder inactive, and when inserting a floppy disk. The Mac asks if you're sure you want to rebuild the desktop. Warning: If you answer yes, any comments you have entered in Get Info boxes will be lost. To preserve Get Info comments, use a special utility program such as DiskExpress from AlSoft (713/353-4090) to rebuild the Desktop file.

If rebuilding the Desktop file does not recover most of the missing space, then your disk may contain other invisible files. A few applications also create invisible files that could be using space on your disk. To see all files on a disk, including invisible ones, use a utility program like DiskTop from CE Software (515/224-1995).

#### Paired Marks

**TIP:** Microsoft Word 4.0 doesn't have a command for putting paired quotation marks, parentheses, or brackets around the current text selection, but you can use MacroMaker to create that missing command.

1. Select some text in Word and choose Start Recording from the MacroMaker menu.

2. Press  $\mathbb{H}$ -X and then  $\mathbb{H}$ -Z to delete and then restore the selected text. This teaches Word where the selection starts and ends.

3. Press the right-arrow key to go to the end of the selection. Type a closing quotation mark (Shift-Option-] in most fonts), right parenthesis, or other ending punctuation mark.

4. Press 0 on the numeric keypad or  $\mathbb{H}$ -Option-Z to go back to the beginning of the selected text. Type an opening quotation mark (Option-[), left bracket, or other beginning punctuation mark.

(continues)



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Swivel 3D<sup>TM</sup>, the award-winning 3D graphics program, helped Dan Klitsner from Klitsner design land a major project with Discovery Toys. His ideas were quickly brought to life on the Macintosh and ready for his clients to view. Using Swivel 3D, Dan built a working model of the rattle that behaved just like the final product. Convincing each department was easy ... Marketing understood how to sell the product, engineering saw how the parts would fit together and move, and the product development team was able to efficiently move the project along to completion. First conceived with Swivel 3D, the elephant rattle -- Tons of Fun -- has become one of Discovery Toys' top-selling products.

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*—Dan Klitsner,  
Klitsner design*



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Requirements: Apple Macintosh<sup>®</sup> personal computer. Min. 1 meg. Swivel 3D is a trademark of Young Harvill/VPL Research, Inc. © 1990 Paracomp, Inc. All rights reserved.

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Requires 1MB of memory. Format compatible with: MacWrite 4.6 and 5.0, MacWrite II 1.0, Microsoft Word 4.0, MindWrite 1.0 and 2.0, PageMaker 3.0. (Requires 2MB for PageMaker.) Check with Lexpertise for further information on product compatibility. Trademarks belong to their respective manufacturers.

Circle 183 on reader service card

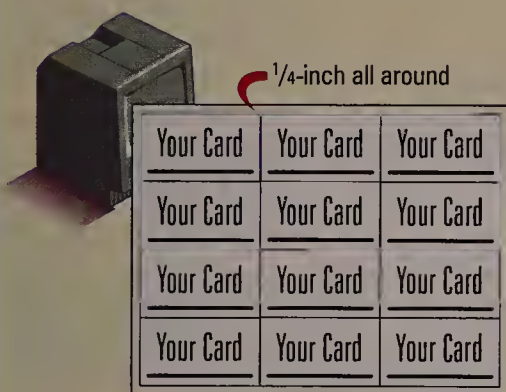
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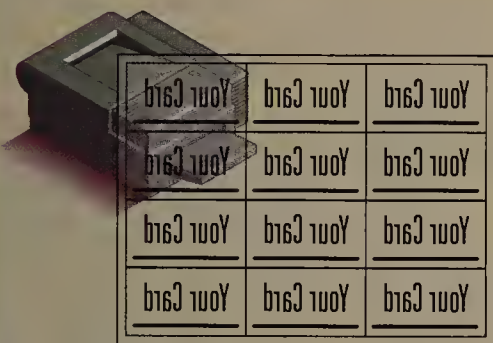


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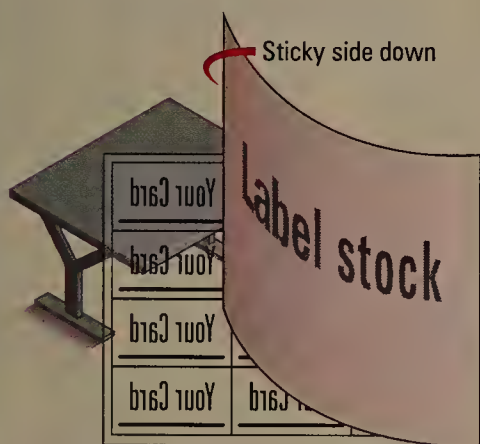
Alex Narvey of Winnipeg, Manitoba, devised this quick and easy way to print durable plastic-covered cards using a LaserWriter. You can use them for name tags, address change notices, cabinet labels, and so on. The toner is protected from cracking by being sandwiched between sticky label stock and transparency film. The price per hundred is about \$5.



Using a graphics program, lay out an 8 1/2-by-11 page with as many cards as you can fit (here we show business cards). Be sure to leave a 1/4-inch margin on all four sides of the sheet.



Using the Apple LaserWriter driver, print a mirror image of your cards on a sheet of transparency film. Choose the Page Setup command (File menu), click on the Options button, and check the Flip Horizontal and Larger Print Area options. Using PageMaker 3.02, check Spot Color Overlays in the Print dialog box (File menu). Click on the Changes button and Mirror option.



Peel the backing off a sheet of solid, sticky-back label stock (Avery #5353 or equivalent). Carefully press the toner, or wrong-reading, side of the transparency sheet to the sticky side of the label stock.



Cut out the individual cards using a pair of scissors, a paper cutter, or an X-Acto knife. Remember to trim away the 1/4-inch margin.

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## QUICK TIPS HOW TO

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Deliver To: Coral Springs Technologies			
Department: Purchasing			
Date Wanted: 12/12/90			
Quantity	Item	Unit Cost	Total Cost
2	Overhead Projector	\$142.00	\$284.00
2	16mm Projector	\$254.00	\$508.00
4	Compact Disc Player	\$158.36	\$633.44
	Shipping	\$30.00	\$30.00
	Tax	\$10.00	\$10.00
Total			\$1465.44

5. Choose Stop Recording from the MacroMaker menu. Name and store the macro and then close the MacroMaker window.

A similar macro removes paired punctuation marks from the beginning and end of the current text selection. Follow the steps above, but in step 3 press Delete or Backspace instead of typing a closing punctuation mark, and in step 4 press ⌘-F instead of typing an opening punctuation mark.

John Broadbent  
Golden Valley, Minnesota

### Pamphlet Page Arrangements

**TIP:** Arranging pages of pamphlets, catalogs, and other small publications in the correct sequence can be tricky if you're printing two pages per sheet of paper. Each page should fill half the sheet so that when the paper is folded and stapled you'll have a little booklet. In Microsoft Word with Full Menus selected, choose the Page Setup command (File menu). In the resulting dialog box, set landscape (sideways) orientation and then click the Document button. In the dialog box that appears, turn on the Mirror Even/Odd Margins option. If you wish, turn on the Even/Odd Headers option. Enter the top, bottom, and outside margins you want. Then add 5½ inches (the width of one page) to the size of the inside margin. Click OK as needed to dismiss the Document format and Page Setup dialog boxes.

If you set the Even/Odd Headers option, the Document menu will have separate commands for even and odd headers and footers. Typically, you would align the page numbers in the odd header or footer on the right and align the page numbers in the even header or footer on the left. If you're

### Incidentally

If you list tax, shipping, and other incidental charges along with items ordered, but don't enter a quantity for those charges, you need a special formula to compute the total cost.

using section breaks in a document to separate different chapters, you may wish to set the Start option to Odd Page using the Section command (Format menu) for each section.

You print the pamphlet in two passes. To determine the number of pages to print in the first pass, take the smallest multiple of four that is higher than or equal to the total number of pages in the pamphlet and divide that multiple by 2. For example, if your pamphlet has 17 pages, the smallest multiple of 4 containing 17 is 20. In this case, you would print the first 10 pages (20 divided by 2). Then for the second pass, arrange those pages face up in reverse order (page 1 on the bottom), return them face up to the paper tray, and print the remaining (in this case, 7) pages. (Note: a LaserWriter Plus automatically puts pages in reverse order; a LaserWriter II does so if you open its face-up exit.)

You now have a set of single-sided originals, each bearing two pamphlet pages. By appropriate double-sided copying, you can prepare copies of your pamphlet ready for folding and stapling.

David S. Allan  
Ann Arbor, Michigan

This method works with any word processing or page-layout program that can automatically adjust page margins for double-sided printing. In MacWrite II, for example, set the Left/Right Pages option of the Pages command (Format menu). In PageMaker use the Page Setup command (File menu) to turn on the Double-sided option and to turn off the Facing Pages option. In QuarkXPress, use the Page Guides command (View menu) to set the Double Sided option, to set margins, and if printing in landscape orientation, to specify paper dimensions (such as 11 by 8½ inches). In ReadySetGo, choose Design Grids from the Special menu, select Grid Setup, click on OK, and then set the Double Sided option and enter the margin settings. —L.P.

(continues)





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## QUICK TIPS HOW TO

### Expediting WriteNow 2.2's Thesaurus

**TIP:** The version of WordMaster Thesaurus that comes with WriteNow 2.2 doesn't work with other programs. It shows up in the Apple menu even when it's not usable. Worse, if MultiFinder is active, an annoying alert reminds you of this restriction whenever you choose WordFinder from the Apple menu—even if you're using WriteNow at the time. After dismissing the alert, you must switch from the DA layer to WriteNow before using the thesaurus. Ugly.

You can eliminate these problems by installing WordMaster directly into the WriteNow program instead of into the System file. Here's how.

1. After installing WordMaster as instructed in the WriteNow manual, open Font/DA Mover (there's a copy on WriteNow Disk 3). Select the Desk Accessory option at the top of the Font/DA Mover window. On the left side of the window is a list of the DAs installed in the System file. WordMaster should be on the list.

2. Press the Option key while clicking the Open button on the right side of the window. Open your working copy of WriteNow 2.2. (If you can't find WriteNow, you didn't press the Option key while clicking Open.)

3. Select WordMaster on the right-hand side of the window and click the Copy button. After Font/DA Mover copies WordMaster into WriteNow, click the Close button on the right side of the window.

4. With WordMaster still selected on the left side of the window, click the Remove button. Authorize removal of this copy of WordMaster when asked to do so. Click the Quit button and you're done.

Caution: If you later install another desk accessory in the System file, it may conflict with the copy of WordMaster in WriteNow. This can happen because the Font/DA Mover doesn't correlate the ID numbers of desk accessories in multiple files. Anything may happen if you try to use a desk accessory that has the same ID number as another desk accessory you're already using. To eliminate conflicts after installing a new desk accessory, copy WordMaster from WriteNow to the System file, remove WordMaster from WriteNow, copy WordMaster

back to WriteNow from the System file, and remove it from the System file. You can also eliminate conflicts by putting Suitcase II or MasterJugler in your System Folder.

Ron Risley  
San Diego, California


### Computing Incidental Charges

**TIP:** If you use FileMaker for invoices or purchase orders, you may want to list incidental charges such as sales tax and shipping in the same repeating field as the deliverable items (see "Incidentally"). For aesthetic reasons, you don't want to enter a quantity of 1 for an incidental charge. (Who ever heard of one sales tax?) If you leave the quantity blank, however, FileMaker computes the total cost of the incidental charge as 0. (Total cost equals quantity times unit cost.) To avoid the problem, use the following formula to calculate total cost:

`IF(Item="", "", IF(Quantity="", Unit Cost, Quantity*Unit Cost))`

The formula stipulates that nothing ("") be put in the Total Cost field if there is nothing in the Item field. If there is something in the Item field but nothing in the Quantity field, then the Total Cost field equals the Unit Cost field. If the Quantity field is not empty, then the total cost equals the quantity times the unit cost.

Peter Theodoroff  
Coral Springs, Florida

.....  
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Lon Poole answers readers' questions and selects their tips for this monthly column. He has written many personal computer books, including the quick reference HyperTalk (Microsoft Press, 1988) and a new book of Mac tips (to be published soon by Microsoft Press), Amazing Mac Facts.



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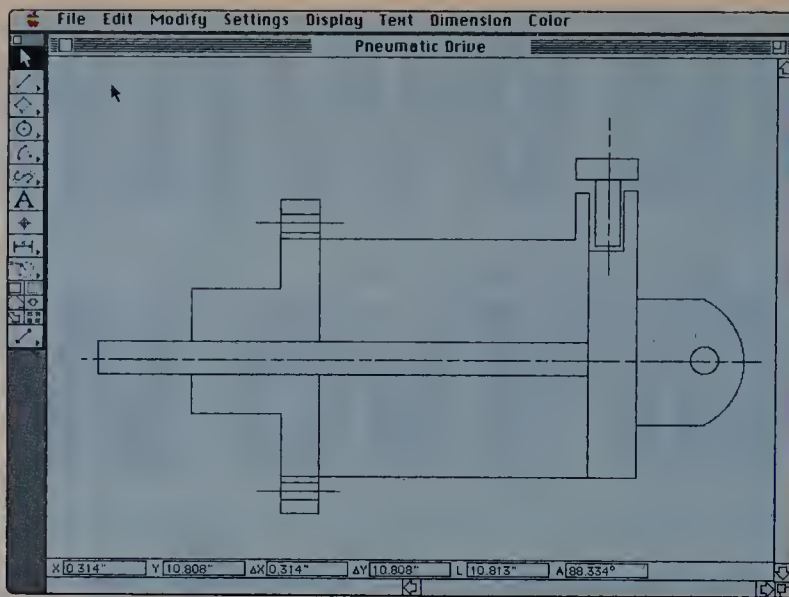
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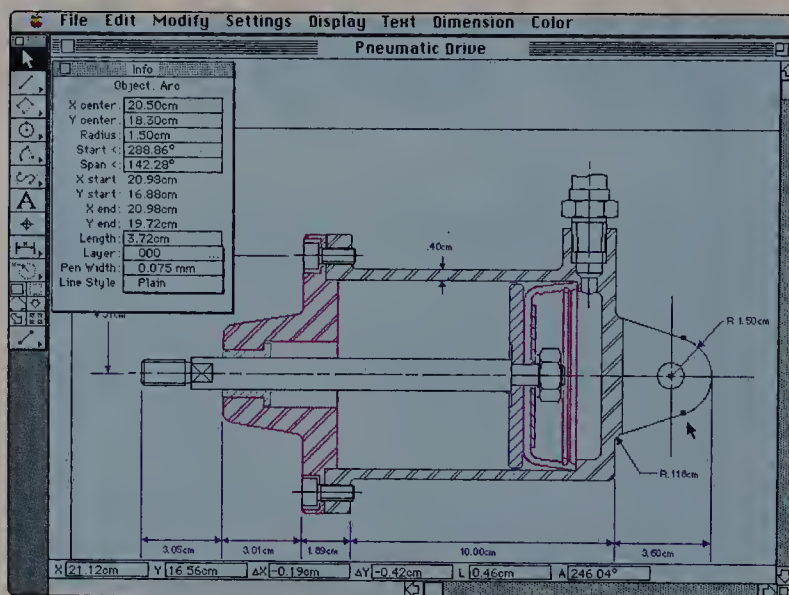
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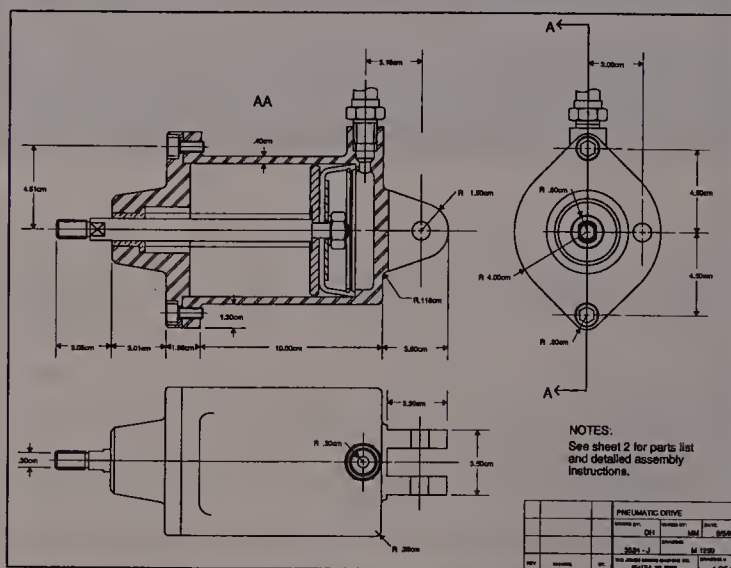




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# Getting Started with Desktop Video

HOW TO PUT YOUR MAC ON TV—CHEAPLY

W

BY JIM HEID

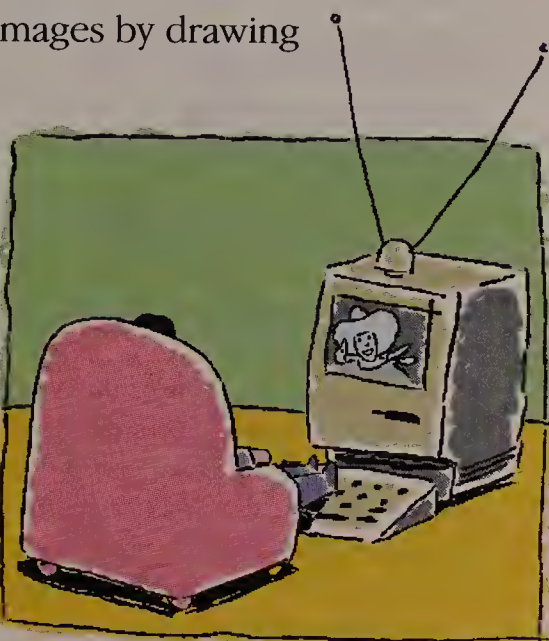
hat looks like a television, but isn't? A computer screen. On the surface, the Mac's screen seems similar to a television set's—it uses a video tube that you definitely do not want to break, and it creates images by drawing

hundreds of narrow horizontal lines.

But beyond that, the Mac and a TV set take very different approaches to creating images. Normally, you don't need to worry about these differences. Your Mac and your TV lead separate lives, with little in common between them.

But then the day comes when, for reasons I'll describe shortly, you would like to videotape what you see on the Mac's screen. It's then that the differences between Macintosh video and *broadcast video* become critical.

This month, I'll explain some of the technical differences between Mac video and broadcast video, and I'll let you in on one of the best-kept secrets in the Macintosh world—a free Apple utility that lets you attach a standard Macintosh II Video Card directly to a video recorder using a simple cable, which you can make yourself or have a TV technician make for you. The results aren't 100 percent *broadcast quality*, as they say in TV, but they're quite close. In any case, it's a wonderful way to try your hand at videotaping Mac images and to learn a bit about how television works. (For details on Mac hardware products that produce broadcast-quality video, see "Prime-Time Video" in this issue.)



WARD SCHUMAKER

## Why Mac TV?

Before we look at the hows and whats of recording Mac screens, it might be useful to spotlight the whys. Here are some project ideas to stimulate the TV producer within you:

**Record a presentation** Perhaps you'd like your employees in the field to see that presentation you gave to the home office. Create your visuals using a presentation program such as Microsoft PowerPoint or Aldus Persuasion, and then use the program's slideshow feature to advance through the visuals while videotaping them. Because you're recording directly from the Mac, you'll get better quality than

if you just aimed a video camera at the screen and podium. You can also record your speech by attaching a microphone or public address system to the video recorder. This technique can also help you fine-tune your presentation—and your presentation skills.

**Record animation** As we saw in last September's "Getting Started with Animation," products like MacroMind Director and Apple's HyperCard allow artists to create impressive computer animations. If you're one of these digital Disneys, you can videotape your efforts and not have to fire up a Mac to show them off. Other pluses: you can see your work on a larger screen and add a sound track. And you can create a longer animation than would otherwise fit in memory or on disk by creating it in several sections and then videotaping each section in turn, pausing the video recorder while loading each one.

**Create a training video** Perhaps your company uses custom-developed Macintosh software, or maybe you'd like to educate new employees on the fine points of your electronic-mail system or network file server. By videotaping your own software or system in action, you can create a custom training video that reflects exactly how your company or department uses the Macintosh.

**Record Macintosh demonstrations** A school in Los Angeles videotapes the HyperCard stacks that students create so they can show their efforts to parents. Indeed, videotaping (*continues*)



the Mac is an ideal way to show someone else what it can do. Just ask Apple, Microsoft, Adobe Systems, and Letra-set. They're among the firms that have produced video demonstrations of their products in action.

**Create a promotional video** By mixing videotaped footage of live action with static or animated visuals created on the Mac, you can create a promotional video that can run in stores or be sent to prospective customers. Some advice: if you don't have any TV production experience, you might want to consult with someone who does. An amateurish promotional video may do more harm than good.

**Create titles for home videos** Let's be honest—this is really what we want to do with our Macs and video recorders, isn't it? And why not? Titles can lend a finishing touch to a home video, and they can be fun. Some video cameras have built-in titling features, but they're often hard to use and their typefaces aren't nearly as attractive as the Mac's. One catch: you can't superimpose a Mac-generated title over a videotaped image without specialized hardware, which I'll describe shortly.

**Set up an emergency monitor** If you attach a Mac to a video recorder that's attached to a TV set, you can use the TV as a Mac monitor. The results aren't great—you wouldn't want to use a TV as a monitor for very long—but they might be good enough to get you through an emergency if your main monitor breaks.

### TV Technicalities

So there are several good reasons to put the Mac on TV. But why can't you just aim a video camera at the Mac's screen?

Actually, you can, but you may be disappointed by the results. For one thing, you're likely to pick up glare or reflections from the screen. For another, your videotape will have a fuzzy, out-of-focus appearance, even if you're extremely careful about positioning the camera. Worst of all, because of technical differences between Mac video and TV, your videotape will have a horizontal line running through it every few seconds. The bottom line: to get a clean recording of the Mac's screen, you need to attach the Mac directly to a video recorder.

## DESIGNING FOR TELEVISION

**T**o learn about the unique requirements of television graphic design, I talked with Anne Healy, graphic artist for NBC's "Late Night with David Letterman." Her advice: Keep it simple. "On television, everything looks soft," she says. "There's no real accuracy because of the [limited] resolution."

### Some specific tips:

- Avoid thin lines. Lines that are one scan line wide will flicker badly, and even lines that are two scan lines wide tend to break up. Use horizontal lines that are an even number of pixels (2, 4, 6, 8) high.
- Avoid tightly spaced parallel lines, small boxes, and tight concentric circles. All three are prone to flicker because they conflict with the TV's scan lines. Make them heavier and space them farther apart than you might for a printed graphic. Think of stock market graphs you see on the news: they're often superimposed over a grid, but the grid boxes are large. Healy recommends a minimum box size of 1 square inch, as seen on a 19-inch television.
- Avoid lightweight fonts such as Helvetica Light or Univers 45. Serif typefaces are also risky in small sizes because the serifs tend to become blurred and hard to see. Bodoni, for example, doesn't work well in small sizes because the serifs and thin portions of characters are too thin. Times and Caslon don't always work well, either. Century Schoolbook is better,

because its thins aren't very thin.

▪ Don't space characters too tightly. Avoid excessively close kerning. The edges of characters "bloom" when televised, so the characters appear closer together than they really are. To compensate, space characters so that they look a bit too loose on the Mac's monitor.

▪ Choose colors carefully. As a general rule, combine colors that are very different, like a light blue and a dark red, not a medium red and a medium blue. "Once I used a full range of pastel colors," Healy says, "and they all ended up looking the same." Also, avoid colors that are too hot, like hot pink or lemon yellow. If you want yellow, use a more golden yellow. If a color is too hot, it can bleed past its borders or appear to vibrate.

▪ For titles that will not be superimposed over an image, use a black background and white or colored text. Black or colored text on a white background is rarely used in television—for the same reason that it's rarely used in presentation graphics: an all-white background tends to be too glaring and harsh.

▪ For titles that will be superimposed over an image, keep the text simple—use a font such as Univers 65 or Helvetica Medium—and choose a color that will allow the text to be visible over the background. Don't use white text, for example, if the background is a snow-covered ski slope.

To unite a Mac and video recorder, you need to attach the Mac video board's video-output connector to the video recorder's video-input connector. You also need to be sure that the Mac is sending a signal that the video recorder can receive. And that's when you encounter the differences between Mac video and TV.

The first of these differences concerns those horizontal *scan lines* that form video images. On all video tubes, these lines are formed by an

*electron gun* (or, with most color monitors, three electron guns) within the video tube. The gun fires a stream of electrons at the tube's inner surface, causing its phosphor coating to glow briefly.

On a Mac II with Apple's standard Macintosh II Video Card, there are 480 horizontal scan lines, and they're painted one at a time, from left to right, from the top of the screen to the bottom. One complete set of scan  
(continues)



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lines is a *frame*. The Macintosh II Video Card repaints the entire frame 66.67 times per second (which translates into a *frame rate* of 66.67Hz).

By contrast, American television uses 512 horizontal scan lines, painted in a very different manner. Instead of painting one frame's worth of scan lines from top to bottom, a TV set paints them in two separate passes, or *fields*. First, all the odd-numbered lines are scanned, and then all the even-numbered lines are scanned. Each field is painted 30 times per second, giving broadcast video a frame rate of 30Hz. Thanks to *persistence of vision*—the same phenomenon that makes movies appear to move—we see the two fields as one image. This two-fields-per-frame approach is called *interlaced video*. The Mac's approach of painting all the scan lines in one pass is called *noninterlaced video*.

Mac video and TV also handle color differently. In the Mac, the signals for red, green, and blue—the primary additive colors from which all colors are created—each travel on a

separate wire. Other wires carry synchronization, or *sync*, signals. This approach is called *RGB video*.

In the TV world, the red, green, and blue signals are merged with the sync signals into a *composite* signal that's technically simpler but lacks the sharpness and clarity of RGB video. The rules that describe the format of a composite broadcast video signal were developed about 30 years ago by the National Television System Committee, or NTSC. Broadcast video is often referred to as *NTSC video*, or by the name of the standard itself, *RS170*.

#### Lowering Your Standards

So in many ways, an NTSC signal is technically inferior to a color Mac's video signal. That's to be expected, given the less-demanding nature of television—a TV image doesn't have to be sharp enough to display small text that's legible at arm's length. To record a video signal directly from the Mac, we need, in essence, to tell the Mac to lower its standards.

Hardware add-ons such as Mass

Microsystems' ColorSpace Ili (for the Mac II family) and ColorSpace Plus/SE (for the Plus and SE) do this by outputting a true NTSC video signal. Often such products also include a *genlocking* feature that lets you superimpose a Mac video image over an existing video image. When you see an announcer's name appear at the bottom of the screen as he or she speaks, you're seeing genlocking in action.

But specialized video hardware starts at about a thousand dollars and goes way up from there. It's hard to justify such an expenditure if you do desktop video only occasionally.

That's where the Macintosh II Video Card Utility comes in. If you have the original Macintosh II Video Card, you can get reasonably good results with no additional hardware, except the cable. Alas, the utility doesn't work with the IICI's built-in video circuitry or with the three new video boards Apple unveiled earlier this year. Those boards, however, can produce NTSC video directly using a special adapter (*continues*)

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## GETTING STARTED HOW TO

cable (see "Power at a Price" and *State of the Mac*, *Macworld*, May 1990).

### What It Does—and Doesn't—Do

The Apple video utility relies on the Macintosh II Video Card's ability to be reprogrammed to put out a different kind of video signal. The utility is a start-up document (an INIT) that reprograms the video board to output a signal that's very close to the NTSC standard. The signal isn't completely NTSC-compatible, says Jack Palevich, the utility's creator, because "the video card isn't infinitely programmable." Because he couldn't completely reprogram the board, Palevich was forced to "round off" certain aspects of the modified video signal and, as a result, some video equipment may not be able to receive the signal perfectly. I had no problems tuning in the Mac's signal on a Sony VCR. If you have problems, you may be able to resolve them by adjusting the video recorder's fine-tuning controls.

The utility supports each of the Mac II Video Card's modes (2, 4, 16,

or 256 colors), but in black and white only. So, you can record gray-scale images or use the fade-in and -out effects of programs like MacroMind Director, but you can't record in color.

Perhaps the most serious problem with recording Mac screens is that any horizontal lines that are 1 pixel wide—like the lines in the title bar of a Mac window—flicker like a 1930s cartoon. This distracting flicker occurs because of the NTSC standard's interlaced approach—a horizontal line that's one scan line wide will appear in only one of the two fields that make up each frame. Thus, the line flashes on and off 30 times per second.

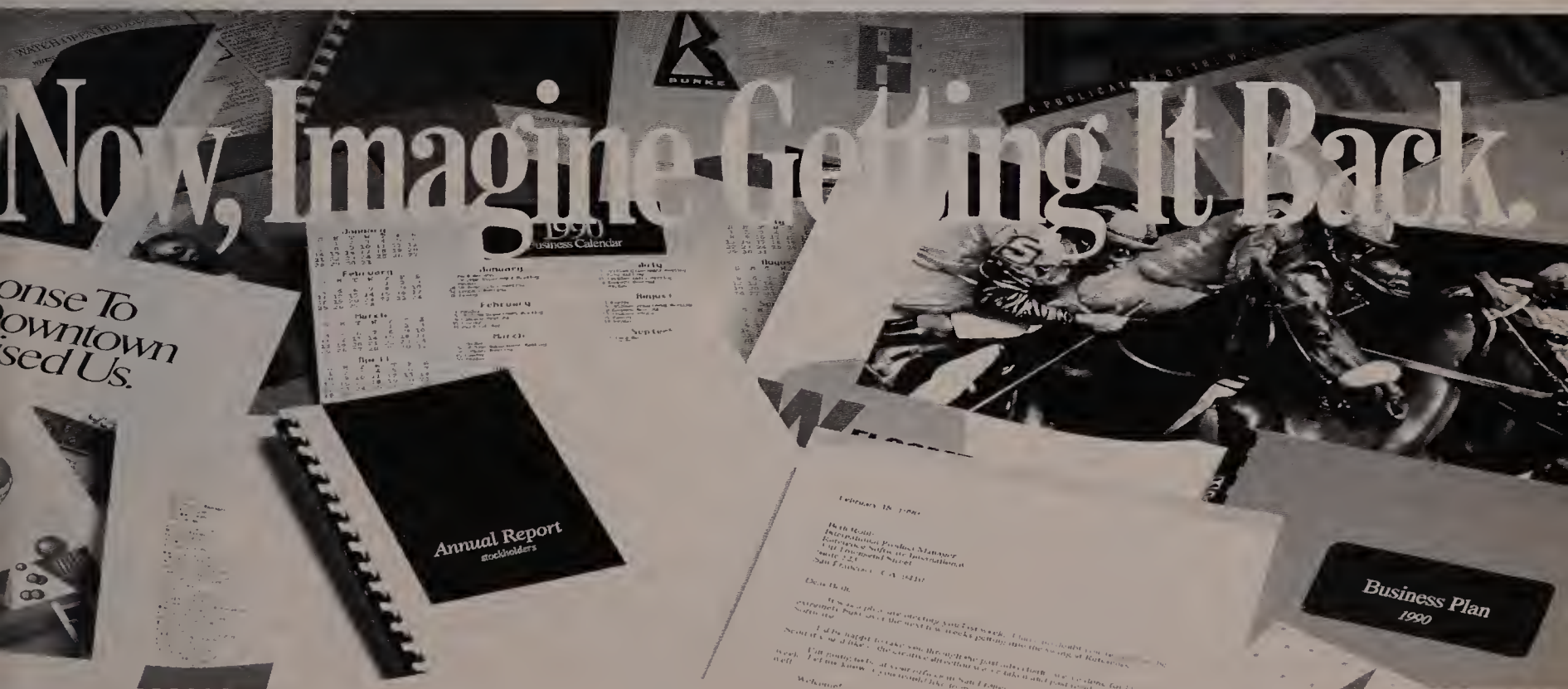
The Apple video utility fixes this by providing a *flicker filter*, a software routine in which each scan line is evaluated and averaged with lines adjacent to it. If that sounds similar to the Apple Convolution feature built into Apple's latest video boards (and described in "Power at a Price," May 1990), it is. The Apple Convolution routine was based on the flicker filter in this free and humble utility.

But filtering flicker isn't free—it uses 48K of memory and slows the Mac by 20 to 40 percent. Pull-down menus become ooze-down menus. Animations run in slow motion, although you can often adjust for that by playing the animation back faster. (This performance penalty doesn't apply to Apple's new video boards.)

### Using the Utility

The Apple video utility includes several pages of clearly written documentation, so I won't describe how to get it up and running here. I will, however, describe what you need to use it and provide some tips gleaned from my own experiments. The utility itself is available for downloading from CompuServe and America Online. It should also be available through user groups. Keep in mind that the utility is unsupported, though. Apple, your local dealer, and *Macworld* are not responsible for, or obligated to help you with, any problems you have.

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(continues)



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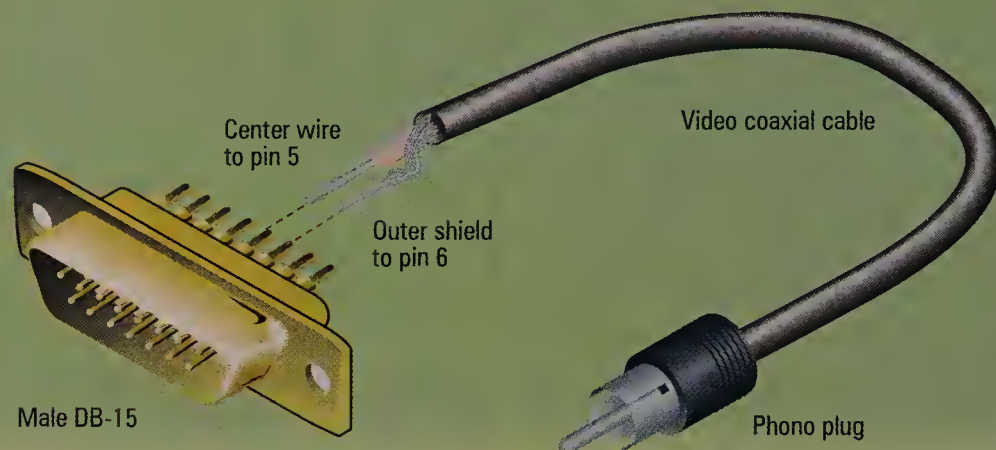
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## MAKING THE CONNECTION



To attach the Macintosh II Video Card to a video recorder, construct a cable as shown here. The Macintosh end of the cable requires a male DB-15 connector. Many video recorders use a female RCA phono plug for their video inputs; in such cases, the recorder end of the cable should use a male RCA phono plug. You can use a shielded audio cable as a starting point for your cable, cutting the plug from one end and attaching the wires to the DB-15. The center wire of the cable attaches to pin 5, while the outer shield wire attaches to pin 6. Caution: You can damage your Macintosh and your video equipment by constructing the cable improperly. Consider having a video technician construct the cable for you.

need System 6.0.3 or a later version, along with the 32-Bit QuickDraw and Monitors files that accompany those versions. You'll also need to make a simple cable (see "Making the Connection").

You may need to flick a switch on your video recorder to tell it that video is coming from the video-input connector, not the recorder's built-in TV tuner. On my Sony VCR, for example, I move a switch labeled Input Select from the Tuner to the Line position. Check your video recorder's manual for details.

To record sound coming from the Mac, attach its audio-output jack to the video recorder's audio-input jack. (For details on connecting the Mac's sound jack to other audio devices, see "Getting Started with Digital Sound," *Macworld*, November 1989.) You can also record sound from a different source—such as a public-address system or stereo—by connecting the sound source's line-output jack to your video recorder's line-input jack.

To create titles for a video, consider using a paint program (I used PixelPaint 2.0) that lets you hide the

menu bar and its tool palettes. Create the title using the program's text-editing tools, and then hide its menu bar and tool palettes before recording the title. Because of a television industry practice called *overscan*, in which the image projected onto a television's video tube is larger than will fit, the outer edges of the Mac's screen won't appear on the television or videotape (see "Video Boundaries"). So it's best to design the title to occupy the center of the Mac's display—although you still may need to adjust the position of the text after you've connected the Mac to the VCR and TV.

Most commercial video products compensate for overscan. Also, when you activate the flicker filter in the free Apple video utility, the utility shrinks the Mac II's screen so it has the same dimensions as a compact Mac's—512 horizontal pixels by 342 vertical pixels. This allows you to videotape a full Mac screen, which is especially useful if you're taping a training video or HyperCard stack.

Overscan was born in television's early days, when the image on a picture tube would gradually shrink as

the tube aged. Today's picture tubes don't suffer from this flaw, but overscan remains, partly to accommodate the elderly televisions still among us and partly because television manufacturers would rather fill an entire screen than have a black border around its image. On the other hand, computer monitors *underscan*—they project an image smaller than the tube's surface in order to show every precious pixel.

And that brings up the issue of designing titles for television, whose technical limitations impose some restrictions on graphic designers. You'll find some tips from a professional in "Designing for Television."

### Signing Off

If you try Apple's utility, drop me a line and let me know how it worked for you. Write to me in care of *Macworld*, or send electronic mail to 76174,556 on CompuServe, or to JimHeid on America Online.

Thanks to specialized video hardware, the Mac is playing a role in professional video production. Thanks to Apple's free utility, the Mac can play a role in the amateur video world, too. We video buffs owe thanks to Jack Palevich for developing the utility and to Apple for making it available. **M**



### Video Boundaries

**Of the Mac's standard 480 horizontal lines, only about 360 appear on a TV screen. To compensate for this, avoid using the outer 15 percent or so (about an inch and a half) of the screen.**

See *Where to Buy* for contact information.

*Jim Heid is a Macworld contributing editor who each month focuses on a different aspect of Mac fundamentals. His latest book, coauthored with Peter Norton, is Inside the Apple Macintosh (Brady Books, 1989).*



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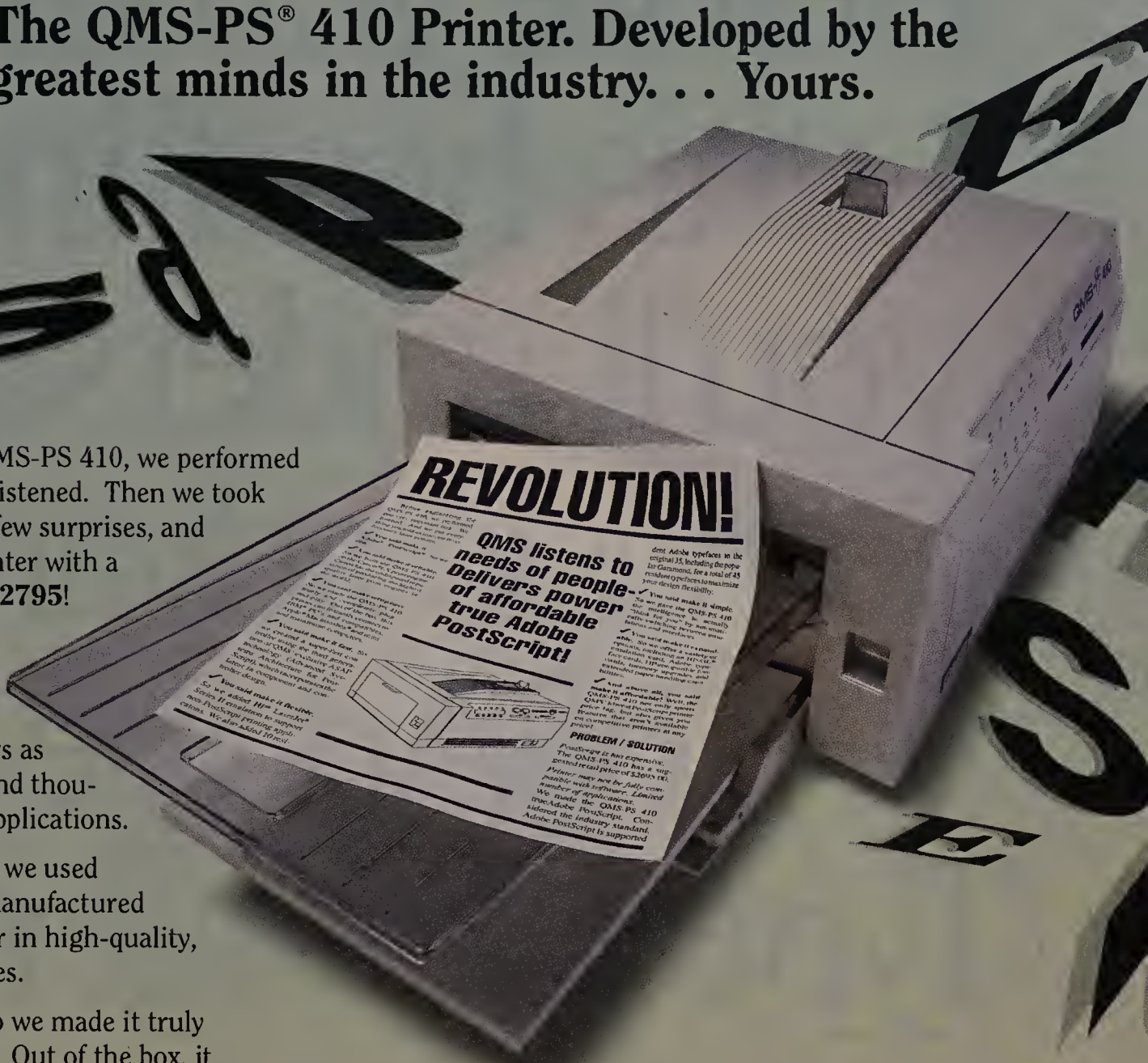
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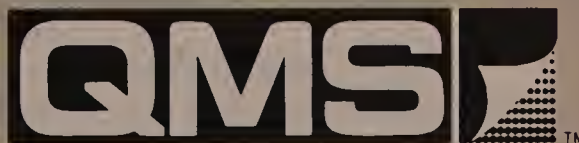
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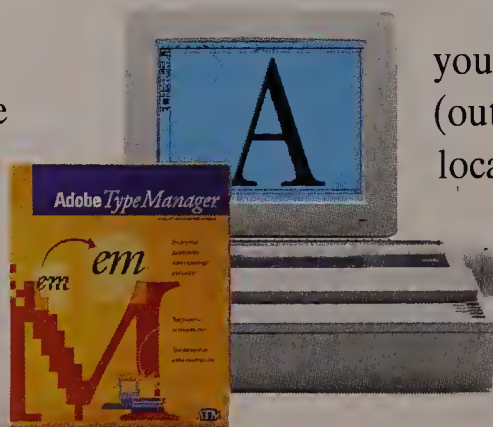
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# Insights on Canvas 2.1

DRAWING TIPS FOR CANVAS DABLERS

D

BY ERFERT FENTON

eneba Software's Canvas, like fine wines, violins, and Sean Connery, just keeps getting better with age. Version 2.1 adds such niceties as a preview window for aligning objects, improved bezier curves, dashed lines, a color-separation

utility, and—of all things—a spelling checker. The following tips should make you a more proficient illustrator the next time you face a blank Canvas screen. Thanks to Rebecca Huba, Brooks Bell, Carmine Delligatti, Fawad Khan, and David Rumfelt for their help.

## Selective Changes

Let's say you've just spent 40 hours drawing a detailed floor plan of the Palace of Versailles in Canvas 2.1. You print it out and discover, to your dismay, that the pen lines you used for the walls look a mite thin; you wish that you'd used a 2-point pen line instead of a 1-point line. The fact that you waited 40 hours before printing a proof does not speak well of your IQ, but fortunately Canvas 2.1 provides the means to rectify just such a cretinous oversight.

To change all the 1-point pen lines in your drawing to 2-point lines (or any other custom line width you specify), follow the steps below. This tip will allow you to change other drawing attributes as well, such as colors, fill patterns, or pen patterns.

1. Hold down the Option key while you choose Select All from the Edit menu. Release the Option key.

2. Go to the Tool Box and select

the drawing attribute you want to change. In this example, you'd go to the Pen Manager and select the 1-point pen size. Canvas will select all objects that were drawn with the 1-point pen.

3. Next select the change you want to implement—in this case the 2-point pen size—in the Pen Manager dialog box. The program will change all 1-point pen lines to 2-point lines.

Of course, this method will change all the 1-point pen lines in the drawing. If your drawing of Versailles con-

tains some details that *should* be drawn with the 1-point pen, you'll have to change them back by hand.

## AutoTrace with Finesse

The AutoTrace To command converts a bitmapped image into a set of polygons, which can be edited like any other object-oriented graphic. But AutoTrace To may not capture enough detail for your liking. Not to worry. You can instruct it to trace with more precision by following these simple steps.

1. With the lasso, marquee, or arrow tool, select the bitmapped image (or portion thereof) you want to trace.

2. Choose Object (Object menu). In the dialog box that appears, change the resolution from 72 to 150 or 300 dots per inch and click OK.

3. Select AutoTrace To from the Effects menu.

4. Go into the living room, settle into your favorite chair, and read *War and Peace*. If you're tracing a detailed image, the AutoTrace procedure could take quite a while. But the improvement should be worth the wait;

compare the traced images in "A Trace More Detail." (Note: You can cut the tracing time somewhat if you select the AutoTrace To command's Smooth Polygon option, rather than Polygon. The Smooth Polygon option captures fewer vertices when tracing an image.)

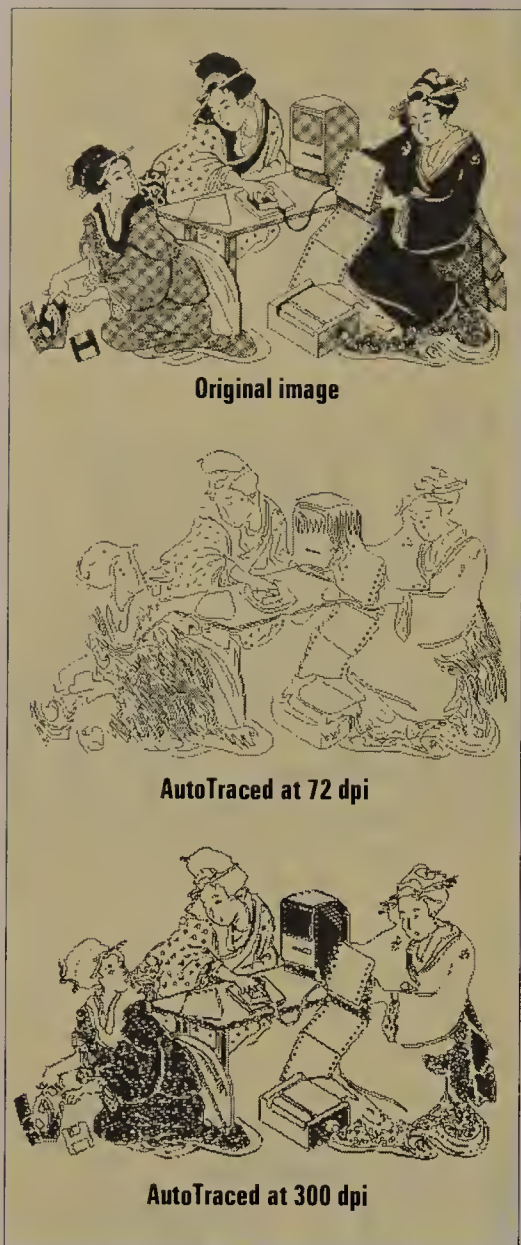
## Editing Polygons

Let's say you've autotraced an image at 300 dpi, as suggested in the last tip. (continues)



MICK WIGGINS





#### A Trace More Detail

To autotrace with greater precision set a higher resolution in the Object Manager dialog box.

A polygon, as you can see from the figure entitled “A Thousand Points of Line” can be made up of a great many vertices. Grabbing a single point to edit the polygon can be tricky, even when the image is magnified.

Here’s how to reduce the number of editing points in a polygon.

1. Select the polygon.
2. Choose Object from the Object menu. In the Object Manager dialog box, the icon indicating Object Type will be a polygon. Change it to the free-form shape and click OK. When you return to the shape, it will have half the number of editing points it had as a polygon.

3. With the shape selected, choose Edit Polygon from the Object menu or double-click on the selection to enter the editing mode.

(Note: Removing too many points in a polygon can distort its shape. If yours ends up drastically altered,



#### A Thousand Points of Line

Polygon precision is well and good, but you might find it hard to edit the seething tangle of points that make up some smooth polygons. To reduce the number of points, change the polygon to a free-form shape.

immediately select Undo from the Edit menu to restore the original.

#### Permanent Palettes

If you have the screen space, you can tear off Canvas palettes and place them anywhere you like for easy access. To tear off a palette, select the Hand tool, hold down the spacebar, grab the palette, and place it where you want it. You can tear off palettes for Magnification and Reduction, Fill Patterns, Pen Patterns, Colors, Line Widths, and Transfer Modes. (If palettes overlap, just click on the gray bar at the top of a palette to bring that palette to the front.)

#### Curbing Curve Closure

If you’re drawing along with the bezier curve tool and place a point within a few pixels of the curve’s starting point, Canvas assumes you want to make a closed shape. Before you can say “Gaaa! I didn’t want to do that!” the program has neatly joined the errant point to the starting point, making your would-be curve into a closed shape. To curtail this potentially annoying feature, hold down the Tab key as you draw. Even if a point strays dangerously close to the starting point, the curve will remain a curve.

#### Quicker on the Redraw

If the drawing you’re working on contains a lot of complex objects, you can waste a good deal of time waiting for the image to redraw after you make a change. Canvas offers several ways to cut down on redraw time.

One way to speed up redraw is to take advantage of Canvas’s Layer Manager. Create parts of your drawing in different layers of Canvas. When you’ve finished a section, turn off that layer (uncheck the Layer Manager box labeled Visible). The graphics in that layer won’t show up on screen and bog down the redraw rate. When you’ve finished all the drawing elements—or need to see how they interact—turn all the layers back on to see the entire drawing.

Another way to avoid unnecessary redraw time is to work in wire-frame mode, which eliminates colors, fills, patterns, and pen widths during redraw. To enter wire-frame mode, select Display from the Layout menu, choose Wire Frame from the Display submenu. To view shading, line widths, and so on, select QuickDraw from the Display submenu.

If you want to turn off redraw altogether, press ⌘- (period). To resume redraw, press ⌘-K.

#### Paste and Trace

Here’s how to trace a scanned image:

1. Open the scanned image in Canvas 2.1. It will automatically appear in Layer #1.

2. Open the Layer Manager and click the New Layer button. Canvas 2.1 will, predictably enough, name the new layer Layer #2.

3. In the Layer Manager’s list of drawing layers, select Layer #1 and check the Grayed option.

4. Now, select Layer #2 and click (continues)



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### The Layered Look

Canvas allows you to place a scanned image in one drawing layer and trace it in another.

OK. You will return to the drawing window, with Layer #2 as the active drawing layer. The scanned image in Layer #1 appears in gray, allowing you to see the black lines you'll use when tracing (see "The Layered Look").

5. Set the fill pattern to None.
6. Choose Preferences from the File menu and check Retain Selected Tool After Drawing.

You can now use the pen or the Freeform tool to trace the grayed image. Use the Layer Manager to delete Layer #1 before printing, or use the Print Layer command to specify that it shouldn't be printed.

### A Bit More Color

If you have a color monitor, you can place an 8-bit TIFF file into a Canvas document. With a 32-bit color board, you can also import 32-bit TIFF images. Hold down the ⌘ key as you open a TIFF file; it will appear in 32-bit instead of 8-bit color.

### Shortcuts

When you select the Text tool and hold down the mouse button, a pop-up menu lists styles and justification options. You can quickly access other text options as you perform the same operations while holding down the following keys:

⌘ key: a list of fonts appears

Shift key: a list of sizes appears  
⌘ and Option keys together: a font list appears with each font name displayed in the font itself (for example *Times* is in the Times font)

When you select the Line Manager (the long box with a line in it) and hold down the mouse button, a selection of line styles appears. The following shortcuts allow you to select other line attributes:

Shift key: an array of line terminators appears

Option key: a choice of dashed lines is displayed

### Share the Wealth

If you've found a tip or shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips*, *Macworld*, 501 2nd St., San Francisco, CA 94107. **M**

See *Where to Buy* for contact information.

*Erfert Fenton is a Macworld contributing editor who specializes in fonts and graphics. She'd rather be sailing.*

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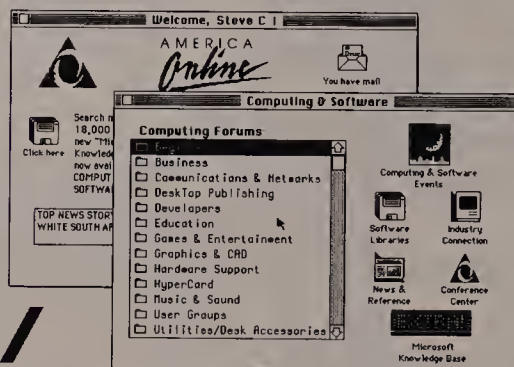
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If you're new to the Macintosh word processing market you probably want a word processor that is easy to use. If you've been around for a while, you undoubtedly want a powerful word processor. Chances are you have tried either MacWrite or Microsoft® Word 4.0.

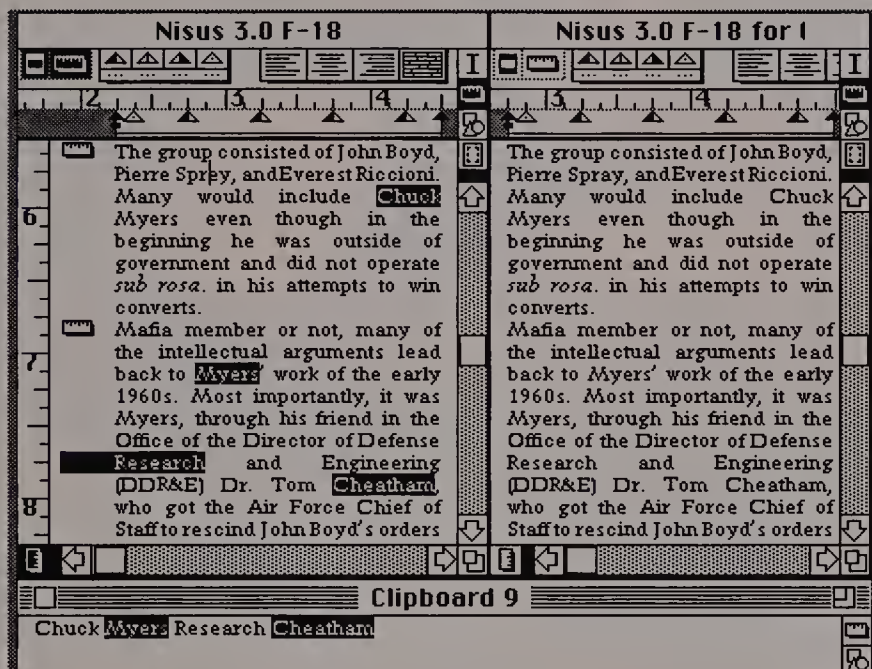
One is easy to use, the other offers power. Both, however, have severe limitations which is why we developed Nisus in the first place. Here with abject brevity are just a few of the reasons we know you'll find Nisus 3.0 easy to use with all the power you'll ever want.

## Built-in word processing language

For power, consider the fact that Nisus allows you to create custom routines beyond what we have already done for you, with our built-in word processing language. You don't have to use this feature, but it's there if you need it. It is one of the many features that distinguishes Nisus 3.0 from Word 4.0. It will let you, for example, create routines to index every word in a document, while stripping out *and*, *or*, *the*, *but*, and other nonessential words. One user even built a routine to index all proper names. Another user developed a method to find and correct all double words, periods, and extra spaces. The opportunities are unlimited.

## Find and Replace virtually anything

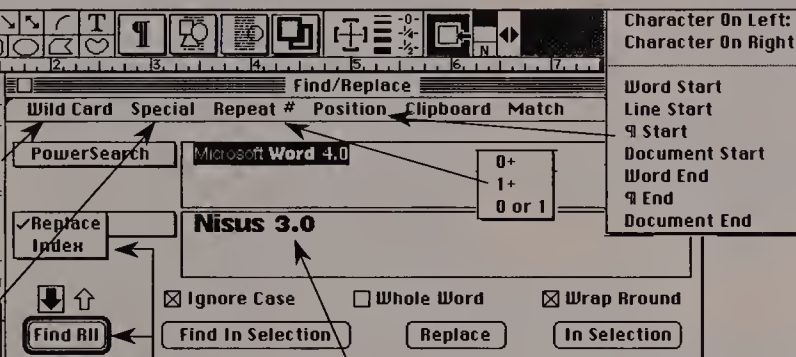
Nisus 3.0 will let you find any text, style, size, or color in any



The automatic file comparison above sent the cursor directly to the first instance where the files differed, which in this case was Sprey versus Spray. Note the noncontiguous text selection works even in any of the 10 editable clipboards. (Note the vertical ruler on the left which allows you to keep track of where you are.)

You can simply click and draw on a transparent layer, either behind or in front of the text, and have the text wrap around the graphic or flow through it. Draw a simple arrow and type a margin call-out box with one click, then move it anywhere on the page.

Any character  
Any character or 9  
A-Z a-z  
R-Z a-z 0-9  
0-9  
a-z  
R-Z  
Space or Tab



The "Find" button converts to a "Find All" button with the touch of the option button. This permits you to replace all of the found text or index it.

Note the use of font, size, style and, if you like, even color as a find and replace criterion

combination. But even more powerful is its ability to find every word in a document at once even in unopened files. For example, suppose you want to index a book where the subject is Ben Franklin. With Word 4.0, you'd have to open each file, go to each instance of Ben Franklin, and index them one by one. With Nisus 3.0 you simply find all Ben Franklins—even in unopened files—and instead of selecting *replace*, you select *index*. Think of the time savings on a long document.

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times you type a nugget here and a valued phrase there. So why should you have to select text as though you were a perfect serial thinker. Nisus 3.0's noncontiguous text selection permits you to collect your thoughts on your random walk through the text and bring them all together on one of 10 editable clipboards.

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Nisus 3.0 and Word 4.0 Feature Comparison		Nisus 3.0	Word 4.0
Built-in word processing language		■	
Noncontiguous text selection		■	
Mix column formats		■	
Find all and replace or index		■	
Find any font, style, size, or color		■	
Place text or graphic linked to parent text or graphic file		■	
Find and replace in open or unopened files		■	
Cross-reference text		■	
125,000+ user definable key commands		■	
"Super Style sheets" down to character level		■	
Automatic File Comparison		■	
10 editable clipboards		■	
Mark text as electronic book mark		■	
Built-in Graphics		■	
Rotate text and graphics		■	
Unlimited undos back to "open file"		■	
Reads & Writes Microsoft Word Files		■	■
Vertical Ruler		■	

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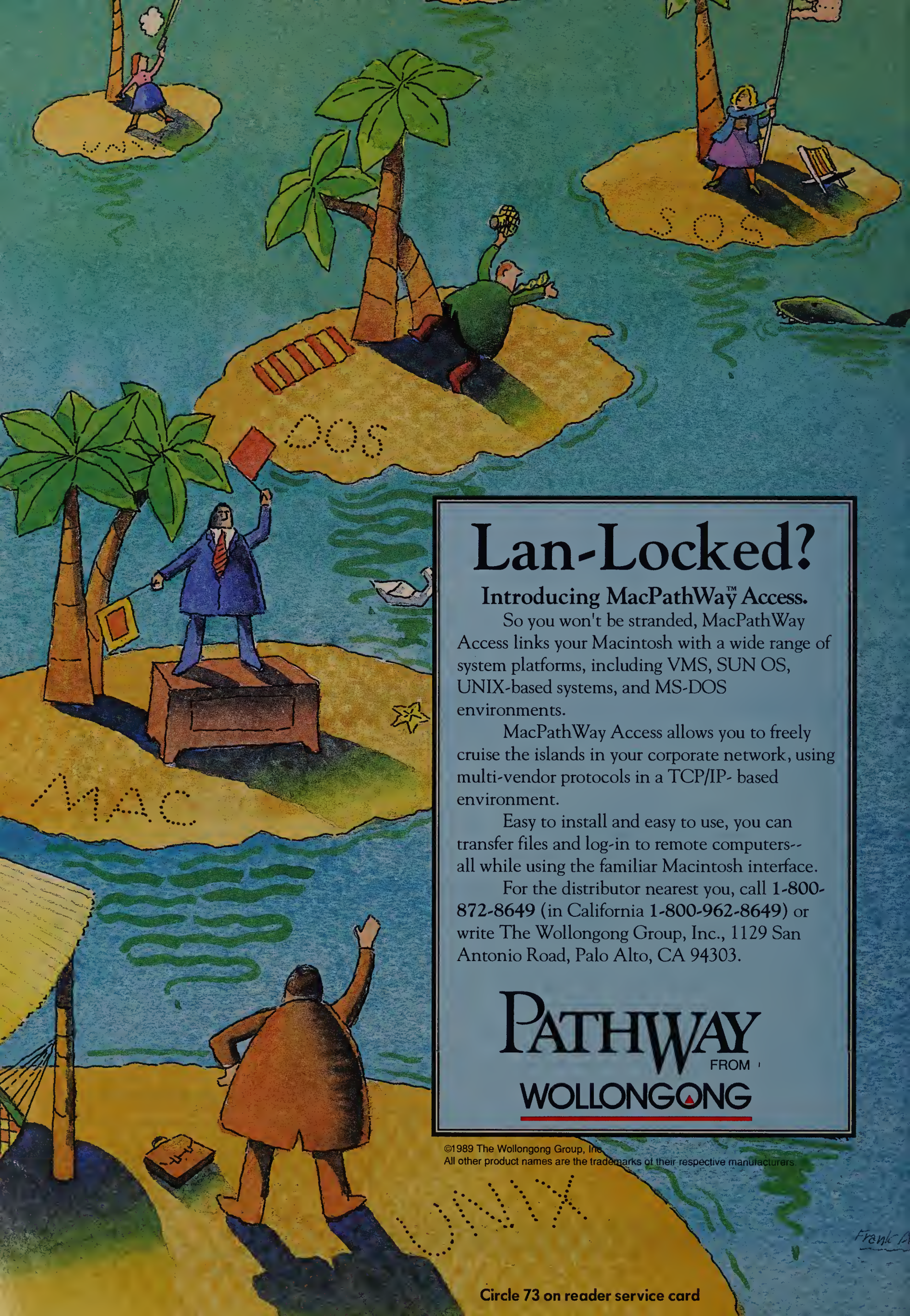
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# UPDATES

Here's our list of the current shipping versions of Mac software at the time we went to press. We hope you'll find it useful—because these days, keeping track of the latest CPU is tough enough.

**DiskDoubler version 2.0** transparently integrates into the open-file dialog box in any application, automatically opens compressed files in the Finder with a double-click, does one-step expansion of StuffIt and Packit archives, joins segmented files, and does one-step

file-splitting for large files that need to be made to fit on floppy disks. Salient, 415/852-9567. \$79 new.

**Lightspeed Color Layout System version 2.0** includes typographic refinements such as track kerning, hyphenation, justification, automatic text wraparounds, hanging punctuation, stand-up and drop initials, fixed spaces, and superscripts and subscripts. Crosfield & Lightspeed, 617/338-2173. Contact vendor for update policy and list price.

**MacDraft version 2.0** has Macintosh II color support; custom fill patterns in black and white or color; enables the user to edit colors and patterns; and gives the user control over color, font, and size of individual characters in a text block. Can rotate text in increments of less than 1 degree. This version includes the ability to save and recall multiple views in a drawing. Innovative Data Design, 415/680-6818. Contact vendor for update policy; \$299 new.

## PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
1st Aid Kit ★	2.8	512KE/3.0		*
4th Dimension	2.0.1	1MB/6.02	3/90	*
Aatrix	2.01	512K/4.1		\$10
CheckWriter II ★				
Aatrix TimeCard	2.0	512K/4.2		Free
Accountant Inc., Pro	1.03	1MB/6.03		\$19.95
ACCPAC Bedford	1.1	1MB/5.1		\$50
Simply Accounting				
AccuText ★	1.1	4MB/6.02	2/90	*
Adobe Type Manager	1.2	1MB/6.02	2/90	Free
AdWriter	2.0	1MB/6.0		Free
After Dark	1.1	512KE/3.2	7/90	\$5
Alchemy	1.1	1MB/6.0		\$25
Aldus FreeHand	2.0	1MB/6.03		*
Aldus PageMaker ★	4.0	1MB/4.1	9/90	*
Aldus Persuasion	2.0	1MB/6.0		*
AmPack Plus ★	4.2.2	512K/3.2	1/90	\$29.95
Analog Connection	3.0	1MB/5.0	5/90	\$50
WorkBench				
Anatool ★	3.1	512K/3.0		\$35
AntiToxin	1.3	1MB/6.0.2	1/90	\$15
APL 68000	7.0	512K/3.2		*
AppleShare File Server	2.0	512K/3.2		*
Archie	2.0	1MB/6.0		\$75
ArchIText	2.0	1MB/6.02		Free
Aristotle's Politics	2.0	2MB/6.03		Free
The Art Importer	2.0	1MB/6.0	5/90	\$20
ArtRoom	3.0	512K/3.2		\$199
AutoCalc	2.0	1MB/6.0		\$95
AutoSave II	1.1	512KE/4.2	7/90	\$7.50
Aztec C	3.6	512KE/4.2		*
BackFax ★	1.02	1MB/6.03	1/90	Free
Back to Basics: Professional	2.0	512K/3.2		\$75
Ball & Stick ★	2.2	1MB/6.0		Free

Product	V.	Req.	Rev.	Price
Bill-It	2.0	1MB/6.03		\$29
Bridge	6.0	512K/3.2		\$17
Business FileVision ★	1.5	1MB/6.02		*
Business Sense ★	1.2	1MB/6.0		*
Business Session ★	3.2	512K/3.2		Free
CA-Cricket Presents	2.0	1MB/6.0		Free
Calculator	2.06	512K/3.2	4/90	\$25
Construction Set ★				
CanOpener	1.1	512K/3.0		Free
Canvas	2.1	1MB/6.0		*
Capture	2.0	1MB/6.0	2/90	\$15
Central System Manager	2.1	1MB/5.0x		*
ChromaScan	1.1	4MB/6.02		Free
Client/Mac	2.0	1MB/6.0		\$370
Colorset ★	1.5	1MB/6.0	6/90	Free
Colleague 2	2.1	2MB/6.03		Free
Comment	2.02	1MB/6.0		*
CommTact	2.0	1MB/6.0		Free
CommUnity Mac ★	1.3.1	1MB/6.0		*
CompileIt	1.5	1MB/6.02	3/90	\$30
CompuServe Navigator ★	2.1	512K/3.2		*
Computerized Classic Accounting	2.2	1MB/6.0		*
ConcertWare	5.1	512KE/4.2		\$35
Control	1.5	1MB/4.1		Free
CopyFlow	2.0	2MB/6.0	6/90	Free
Cue	3.0	1MB/6.03		*
Data Desk	3.0	512K/4.02	6/90	\$125
DataMerge	2.0	512K/3.2		Free
dBase Mac ★	1.01	1MB/4.1		Free
Deluxe Music Construction Set	2.5	512K/6.02	9/89	*
D.E.S.	4.0	1MB/6.0		*

Product	V.	Req.	Rev.	Price
Design Dimensions ★	2.15	5MB/6.03		Free
DeskPaint ★	2.1C	512KE/4.2	5/90	Free
Developer Stack	2.0	1MB/6.0		\$15
DiagramMaker ★	1.1	1MB/6.02		*
Digital Darkroom	1.1	1MB/6.02		Free
DiskDoubler	2.0	1MB/6.02		*
DiskExpress II	2.04	1MB/6.0	9/90	*
DiskFit	1.5	512K/4.1	12/89	\$30
DiskTop	4.0	1MB/6.0		*
Display AdBuilder	1.1	1MB/6.03		*
Dollars and Sense	4.1	512KE/3.2		*
DragonWave	1.1	1MB/6.03		*
Dreams	1.1	1MB/6.02		*
DynaPerspective	2.0	2MB/6.04		Free
DynoDex ★	1.1	1MB/6.0	6/90	Free
Easy Color Paint	1.1	1MB/6.0	9/90	*
Empower II ★	3.03	1MB/4.2		Free
EndLink	1.1	512K/3.2		Free
EndNote	1.2	512KE/3.2		Free
Exodus	2.0	1MB/6.0		\$50
Extender GraffPak	3.0	1MB/6.02		\$30
Falcon	2.2	1MB/3.2		\$3
Fastback II	2.1	512KE/4.1	12/89	\$30
Fast Forms	2.0	512K/3.2	9/90	\$25
FastLabel	2.0	1MB/6.0		\$36
FaxGate ★	1.02	1MB/6.0		Free
Ferrari	1.6	512K/3.2		\$10
Grand Prix ★				
FetchIt	2.0	512K/6.01		*
FileMaker II ★	1.1	1MB/4.2		*
FilmMaker	2.0	5MB/6.0.3		*
Finale	2.01	1MB/6.02	5/90	\$5
Financial Analysis	3.0	512K/3.0		*
Findswell	2.01	512KE/3.2	3/90	*
Fontographer	3.0	1MB/6.0	5/90	*
FontShare	2.0	1MB/6.0		Free

(continues)

**Bold** = first time the product is being listed.

★ = minor update.

**Req.** = min. RAM and system software required.

**Rev.** = last time (in past year) reviewed this or an earlier version.

**Price** = cost for update to registered owners.

\* = contact your dealer for update policy.



## PRODUCT UPDATES

Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.	Price
FormsProgrammer ★	2.03	1MB/6.02		\$15	HyperDA ★	1.2	512K/3.2		\$10	KiwiEnvelopes	3.0	512KE/4.1		\$10
FoxBase +/Mac ★	2.10	1MB/6.0		\$75	HyperEngine	1.1	1MB/6.03		Free	LAN Package	3.1	1MB/6.0		*
Freedom of Press ★	2.2	1MB/6.0		Free	Developer's Tool ★					Language Systems	1.2	1MB/6.03		*
FreeFlow	3.0	1MB/6.03		Free	HyperLibrary	2.0	1MB/5.0		*	Fortran Compiler ★				
Full Impact ★	1.1	1MB/6.0		Free	HyperPort Chess	2.0	1MB/6.0		\$10	LapLink Mac III	3.0	512K/2.0	7/90	*
FullWrite	1.1	2MB/6.02		Free	HyperWindows ★	1.2	1MB/6.02		\$20	LaserPaint Color II ★	1.02	1MB/6.03		Free
Professional ★					Icon-It	2.0	1MB/6.02	9/90	\$29	LetraStudio	1.5	2MB/6.0		\$45
Gamblin' Times	3.0	1MB/6.0		\$10	Iconia ★	7.0	1MB/6.0		*	LetrTuck +	2.0	512K/3.2		\$20
GeoQuery	2.0	1MB/6.0		*	Igor ★	1.1	1MB/6.0	5/90	Free	Lightspeed Color	2.0	1MB		*
Gofer ★	2.01	1MB/4.1		\$25	Image Grabber	2.0	1MB/6.02		Free	Layout System				
GQL	2.0	1MB/5.0		*	ImageStudio	1.5	1MB/6.0		\$99	Lookup	2.0	1MB/6.0	5/90	\$15
Great Gantt	1.2	1MB/6.0		Free	ImageWriter LQ	2.0	512K/3.2		Free	LXR.TEST★	4.0.11	1MB/6.0		Free
Great Plains	5.2	1MB/6.0		*	Print Driver ★					Mac86	2.0	1MB/6.02		\$10
Accounting Series					In-CAD	2.0	2MB/6.0		*	Mac286	2.0	1MB/6.02		\$10
HandOff	1.2	1MB/6.0	4/90	*	InfoLogic Envelope ★	6.0	512KE/4.0		\$5	Mac3270	2.0	1MB/6.03		*
Hard Disk Partition	3.02	1MB/6.0		\$30	Insight Expert	2.2	1MB/6.0		*	MacAnalyst	2.0	2MB/6.0		\$125
Hard Disk Util	3.0	1MB/6.0		\$65	Accounts Payable					MacArchitron	4.0	2MB/6.03		Free
Help DA	3.0	1MB/6.0		Free	Insight Expert	2.2	1MB/6.02		*	MacAtlas Paint	2.0	512K/3.2		\$35
HFS Backup	3.0	512K/3.2		\$35	Accounts Receivable					MacClassAds	4.0	1MB/6.0		*
Hybase ★	1.1	1MB/6.0		Free	Inspiration	2.0	1MB/4.2		Free	MacClint ★	1.1	1MB/5.0		Free
HydroMac	2.0	1MB/6.0		*	Instant-Expert Plus	3.0	1MB/5.0		Free	MacConcept	3.0	1MB/6.03		*
HyperAnimator ★	1.5	1MB/6.03		\$29.95	JetLink Express ★	1.01	1MB/6.0		Free	MacDesigner	3.0	2MB/6.0		\$125
HyperCard ★	1.2.5	1MB/6.03		\$10	KidsTime ★	1.2	512K/3.2		\$15	MacDraft	2.0	2MB/6.0.2		*

# The Run-Around.





Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.	Price
MacDrew II	1.1	1MB/6.0		*	MacTell	3.5	512K/3.0		*	Microsoft Excel	2.2	1MB/6.0.2		*
MacEnvelope	5.0	512KE/3.2		\$25	MacTerminal ★	2.31	512K/3.2		Free	Microsoft File	2.0	512K/3.2		*
MacEnvelope Plus	2.0	512KE/3.2	1/90	\$50	MacToPic	2.0	1MB/6.0		\$25	Microsoft Mail	2.0	1MB/6.02	1/90	*
MacFalcon	2.1	1MB/6.03		*	MacVision	3.0	1MB/6.0.2		\$50	Microsoft	2.01	1MB/6.0		Free
MacFlow	3.0	1MB/6.03		\$30	MacWrite II	1.1	1MB/6.0		Free	PowerPoint				
MacFortran	2.4	512K/4.2		*	Managing	3.0	1MB/6.03	6/90	\$49.95	Microsoft Word	4.0	512KE/3.2	10/89	*
MacFortran/020	2.4	512K/4.2		*	Your Money					Microsoft Works	2.0	512K/6.0		*
MacFortran for MPW	1.1	2MB/6.02		Free	MapGrafix	2.0	4MB/6.03		Free	MindWrite ★	2.1	512KE/4.2		*
MacHerbal	2.0	512K/3.2		\$49	MarketMaster	II+	1MB/6.03		\$25	MiniCad +	2.0	1MB/6.0	11/89	*
MacHotel	3.3	1MB/6.03		Free	MarkUp	1.02	1MB/6.0	5/90	Free	MiniDraw	4.0	512KE/4.2		\$17
MacLine	3.0	512K/3.0		\$25	Master Tracks Pro 4	4.12	1MB/4.1	6/90	\$45	MockPackage Plus	4.4	512KE/3.2		\$15
MacLinkPlus/Wang VS	4.0	512KE/3.2		\$45	MathType	2.1	512K/6.02	11/89	*	Utilities				
MacMainFrame	2.1	2.5MB/6.02		\$100	Matlab	1.2	1MB/3.0		*	Modern Artist	2.0	2MB/6.02		\$150
3270/CUT					MaxPage ★	1.2	512K/3.2		Free	MOMARS	3.1	1MB/6.03		*
MacPhonebook	2.0	512KE/3.2	1/90	*	McClint	2.0	1MB/4.2		\$25	Monte Carlo	2.0	1MB/6.03		\$60
MacPrint	1.1	1MB/6.02		Free	McCPrint	2.0	512K/4.2		\$25	More II ★	2.01	1MB/4.1		Free
MacProject II	2.1	1MB/6.0		Free	McMax	2.0	1MB/5.0		*	MSFL: Pro League	2.0	1MB/6.0		*
MacProof ★	3.2.1	1MB/6.02	2/90	\$30	Memorybank	3.0	1MB/6.0		Free	Football				
MacRecorder	2.0	512K/3.2	12/89	*	Manager					MultiClip	2.0	512K/6.02	8/90	*
MacSafe II		512KE/4.2		*	Mesa Graphics	1.03	512KE/5.0		*	MultiLedger ★	1.1	512K/3.2		Free
MacSchedule	2.0	1MB/6.0		\$30	Plotter Utility					Multi-User	3.01	512K/3.2		*
MacSmarts	3.0	1MB/6.0		*	MGMStation ★	2.5	512KE/3.0		*	Appointment Diaries				
MacSpin	3.0	512K/4.2		\$75	MicroPhone II	3.0	512KE/4.2	7/90	*					

(continues)

# To The Point.



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Mouse			●						
Trackball						●	●	●	
UnMouse	●	●	●	●	●	●	●	●	●

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## MicroTouch

55 Jonspin Road /Wilmington, MA 01887  
508 694 9900 /FAX 508 694 9980

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Circle 426 on reader service card.



# PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
<b>MusicProse</b>	1.01	1MB/6.0	4/90	Free
Music Publisher	2.0.3	1MB/6.0		Free
<b>MyDiskLabeler III</b>		1MB/6.0		\$25
MyTimeManager	2.0	1MB/6.0	5/90	*
Navigate	2.0	1MB/6.0		Free
Nemesis Go	4.0	512K/4.1		*
Master				
Network DiskFit	1.5	512K/4.1	12/89	\$30
The NightWatch ★	1.03	512KE/3.2		*
Nisus	2.0	1MB/6.02	9/89	Free
NuPaint ★	1.04	512K/3.2		Free
Nutrition Stack	2.0	1MB/6.02		\$20
OmniPage ★	2.1	1MB/6.02	2/90	Free
Omnis 3	2.0	512KE/3.2		*
Plus/Express				
On Schedule	2.0	1MB/3.0		*
P51 Mustang	2.04	512K/3.2		\$10
Flight Simulator				
PacerLink	5.0	512K/5.0		*
Panorama	1.5	1MB/4.2		Free
PEGASYS II	3.2	1MB/6.03		Free
Performer	3.4	1MB/6.0		Free
Sequencer ★				
Personal Golf Stats	2.0	512K/3.2	2/90	Free
Personal Reference	2.0	1MB/6.0		\$10
Catalog				
Personal Phone ★	1.1	1MB/6.0		*
PhotoMac	1.5	2MB/6.03		\$75
PhotoMacEdit	1.5	2MB/6.03		\$30
The Phrase	2.0	1MB/6.0	12/89	Free
Thesaurus				
PICT Detective	2.0	512KE/6.0		\$20
PixelPaint	2.0	2MB/4.1		\$99
Plains & Simple ★	1.06	1MB/3.2		*
<b>PostShow</b>	1.1	1MB/6.0		\$35
PowerDraw	3.0	1MB/6.0		*
PowerStation ★	2.5.2	512K/4.1		Free
PowerTools	3.0	4MB/6.0		*
Practica Musica	2.1	512K/3.2		\$10
Printer Interface III	2.0	512K/6.02		\$22.50
Pro-Cite ★	1.3	512K/4.1		*
Professional	2.3	1MB/6.03		Free
Composer				
Professional	2.0	1MB/6.0		\$22
Image II				
The Programmer's	2.0	1MB/6.02		\$10
Online Companion				
Property		1MB/6.0.1		\$100
Management III				
PropsForms	2.0	1MB/6.03		Free
Prototyper ★	2.01	1MB/4.1	9/89	\$79
Publish-It	1.2	512KE/5.0		*

Product	V.	Req.	Rev.	Price
Publish or Perish	5.0	512K/4.2		\$10
Pyro	4.0	512K/4.1	7/90	\$15
Q-Sheet A/V	2.0	1MB/6.0		\$50
QuarkXPress	2.12	1MB/6.02		*
Quicken ★	1.5	512K/3.2	1/90	*
QuickLetter ★	1.03	512KE/3.2	10/89	Free
QuickMail	2.2	512KE/3.2		\$95
QuickShare	2.0	512KE/3.2		\$75
QuickShot ★	2.1	1MB/4.2		\$5
RagTime 3	3.04	2MB/6.0	8/90	\$150
Read-It OCR	2.1	1MB/6.03	12/89	\$29
Personal				
Read-It OCR	3.0	2MB/6.03		*
Professional				
<b>ReadySetGo</b>	4.5	1MB/6.0		*
Real Estate Edge	2.0	1MB/6.03		Free
<b>Rendezvous</b>	2.5	512KE/4.1		\$15
Reports ★	1.2	1MB/6.0		Free
Retail Engine	3.0	1MB/6.0		*
Sales Associate	1.10	1MB/6.03		Free
Sales and Market	2.0	1MB/6.0		\$49
Forecasting Toolkit				
SAM	2.0	1MB/6.0	1/90	\$29.95
ScanMan		1MB/6.0		Free
Model 32				
ScheduleMaker ★	3.01	1MB/6.0		\$25
ScreenSnap ★	2.2	1MB/4.2		*
ScriptEdit	1.1	1MB/6.04	3/90	*
Second Sight	2.0	1MB/6.02		\$33.75
Sentinel	2.2	1MB/6.0		\$30
Shanghai	2.0	1MB/6.02	2/90	\$13
SimpleSpan	2.5	512K/3.2		*
Smart Alarms	2.9.1	512K/3.2		\$12
SmartForm	1.1	1MB/6.0		Free
Assistant ★				
SmartForm	1.1	1MB/6.0		Free
Designer				
SmartScrap	2.0	1MB/6.03		\$20
& The Clipper				
Snap ★	3.1	1MB/3.0	9/89	*
SoftPC ★	1.3	2MB/6.0	9/89	*
Sound Designer	1.5	512K/6.03		\$45
Universal ★				
Spelling Coach	3.1	512KE/4.2		*
Professional				
Spellswell ★	2.2	512K/3.2	5/90	\$20
<b>Spinnaker Plus</b>	2.0	2MB/6.0		\$45
Springboard	2.0	1MB/6.0		*
Publisher				
Stepping Out II	2.0	1MB/4.1		Free
StickyBusiness	1.06	512KE/6.03		Free
Still Light	3.0	1MB/6.0		Free

Product	V.	Req.	Rev.	Price
StrataVision 3d ★	1.4	2MB/6.03	4/90	\$50
Suitcase II	1.2.6	512KE/4.1	10/89	\$25
Super 30	2.1	512KE/6.02	10/89	Free
SuperGlue II with	2.1	1MB/6.0	1/90	*
GlueNotes				
SuperLaserSpool	2.0.2	1MB/6.0		\$30
SuperPaint	2.0	1MB/6.02		\$50
SuperSpool	5.0	512K/4.1		\$30
Sybil	2.0	1MB/6.0		*
Synchronicity	2.0	512KE/3.2	12/89	\$5
Systat	5.0	4MB/6.0		\$190
Teacher's	2.2	512K/3.2		\$17.95
Rollbook ★				
Temary Plot	3.0	512K/3.2		*
TextPert ★	3.01	1MB/6.0		Free
<b>TextScan</b>	3.04	1MB/6.0		\$69.95
TGRAFF-07/Mac	2.0	2MB/6.0	9/89	*
Think C	4.0	1MB/5.0	2/90	*
Timbuku	3.1	1MB/4.1		*
TimeMinder	2.0	1MB/4.2	9/89	\$50
Timeslips III	2.0	1MB/6.02	2/90	*
TML Pascal II	3.0	1MB/5.0		\$79.95
TMON ★	2.8.4	512K/4.0		*
TOPS/Mac	3.0	512K/3.2		*
Trapeze ★	2.1	1MB/6.0		\$35
TrueBASIC ★	2.02	1MB/6.0		Free
TrueForm ★	1.1	1MB/6.2	4/90	Free
Turbosynth	2.0	1MB/6.03		\$35
Typeface Library	1.5	1MB/6.03		*
TypeStyler	1.01	1MB/4.1	7/90	*
UNITize ★	1.3	512KE/3.2	10/89	\$20
UpBeat	2.01	1MB/6.0	8/90	\$75
VersaCAO/	2.11	1MB/6.0		Free
Macintosh Edition ★				
Vietnam War	2.0	1MB/6.0		*
Virex ★	2.6	1MB/4.2	1/90	*
Virtual	2.0	1MB/3.2	10/89	Free
Vision	1.1	1MB/6.03		Free
Voyager	1.2	1MB/6.0	4/90	*
VMacS	2.0	1MB/6.0		\$25
Wall Street	3.0	1MB/5.0		\$150
Investor				
White Knight II	11.6	1MB/6.02	7/90	\$35
WillMaker	4.0	512KE/4.2		\$18.50
<b>Wild Things ★</b>	1.1	1MB/6.0		Free
Wingz ★	1.1	1MB/6.0		Free
Word Finder	2.0	512K/3.2		*
WordPerfect for	1.0.3	1MB/4.2		Free
the Macintosh ★				
WorksPlus	2.0	1MB/6.03	1/90	*
Spell				
WriteNow	2.2	512K/4.2	9/90	\$49

To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to *Updates, Macworld*, 501 Second St., San Francisco, CA 94107.



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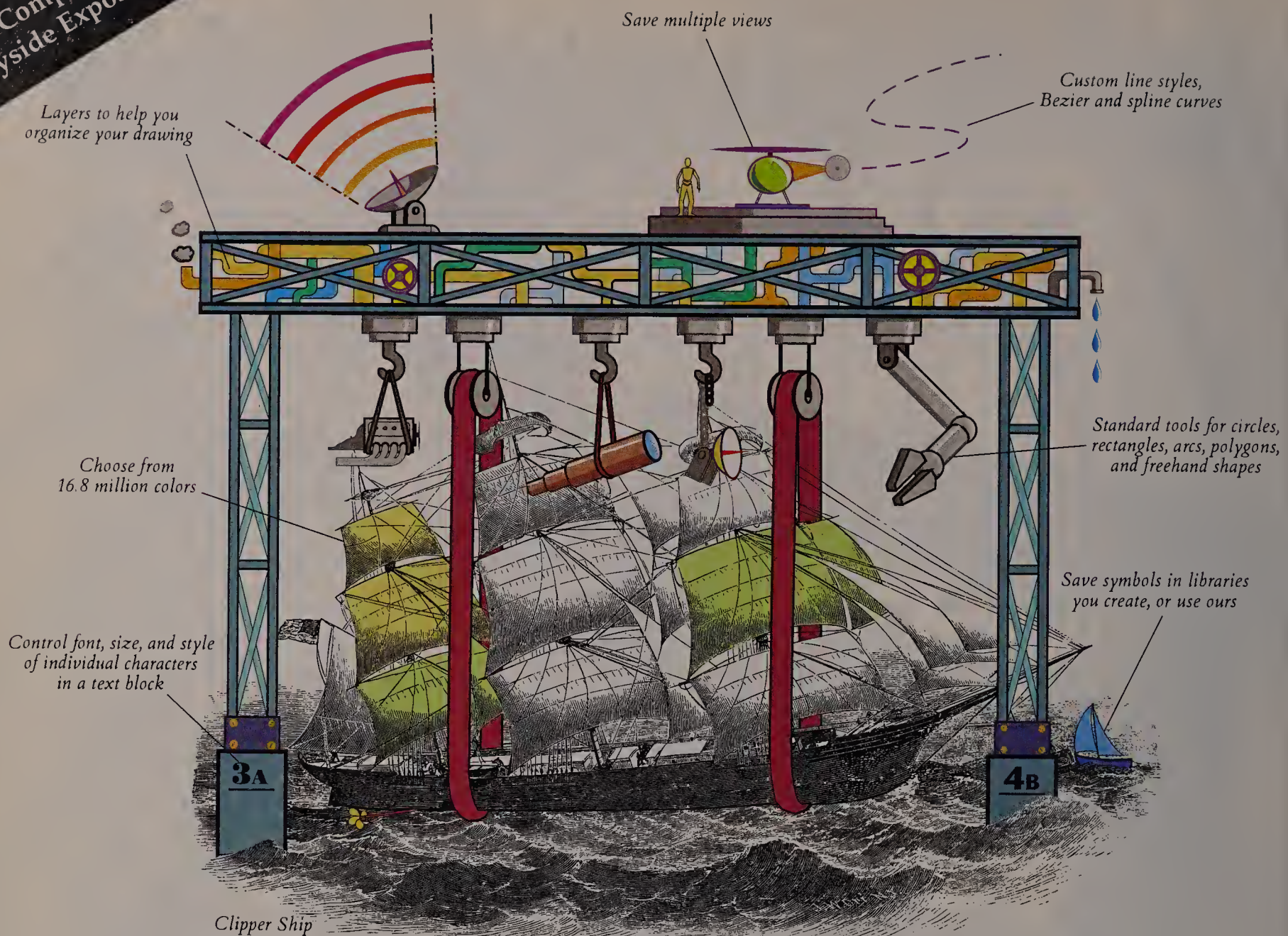
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Circle 508 on reader service card



# WHERE TO BUY

A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue.

Allow several weeks for responses to reader service card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader  
Service

A

- 701 **Accountant, Inc. Professional** Softsync/Bloc Publishing; 212/685-2080.
- 702 **Acta Advantage** Symmetry Software Corp.; 602/998-9106, 800/624-2485.
- 703 **Adobe Type Manager** Adobe Systems; 415/961-4400, 800/833-6687.
- 704 **Adobe Type Reunion** Adobe Systems; 415/961-4400, 800/833-6687.
- 705 **Aldus FreeHand** Aldus Corp.; 206/628-2320.
- 706 **Aldus PageMaker** Aldus Corp.; 206/628-2320.
- 707 **Aldus Persuasion** Aldus Corp.; 206/628-2320.
- 708 **America Online** Quantum Computer Services; 703/448-8700, 800/227-6364.
- 709 **Apple Color High-Resolution RGB Monitor** Apple Computer; 408/996-1010.
- 710 **Apple Hard Disk SC series** Apple Computer; 408/996-1010.
- 711 **Apple LaserWriter II Series** Apple Computer; 408/996-1010.

## ATA Centers

(in order by state)

**Alaska Center for Adaptive Technology** P.O. Box 6069, Sitka, AK 99835; 907/747-6960.  
**Technology Resource Center** 2801 Lee Ave., Little Rock, AR 72225; 501/663-8331.  
**Computer Access Center** 2425 16th St., #23, Santa

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Monica, CA 90405; 213/450-8827.  
**Special Awareness Computer Center** 2975 N. Sycamore Dr., Simi Valley, CA 93026; 805/582-1881.  
**Special Technology Center** 100 View St., #108, Mountain View, CA 94041; 415/961-6789.  
**Disabled Children's Computer Group** 2095 Rose St., Berkeley, CA 94709; 415/841-3224.  
**AccessAbility Resource Center** 1056 E. 19th Ave., Denver, CO 80218; 303/861-6250.  
**Computer C.I.T.E.** 215 E. New Hampshire, Orlando, FL 32804; 407/299-5000.  
**Aloha Special Technology Access Center** 669 Ahua St., Honolulu, HI 96827; 808/834-4092.  
**R.E.A.D.I.** P.O. Box 523, Marian, IA 52302; 319/377-1771.  
**Technical Aids & Assistance for the Disabled Center** 950 W. Roosevelt, Chicago, IL 60608; 312/421-3373.  
**Technology Resources for Special People** 3023 Canterbury, Salina, KS 67401; 913/827-0301.  
**Disabled Citizens Computer Center** Public Library Fourth St., Louisville, KY 40203; 505/561-8637.  
**Blue Grass Technology Center** 898 Georgetown St., Lexington, KY 40505; 606/233-1483.  
**Specialink** 36th W. Fifth St., Covington, KY 41011; 606/491-2464.  
**Center for Adaptive Technology and Educational Resources (CATER)** 3340 Severn Ave., #300, Metairie, LA 70002; 504/888-8964.

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**MA Special Technology Access Center** 1-6 Mudge Way, Town Center, Bedford, MA 01730; 617/275-2446.  
**Living and Learning Resource Centre** 601 W. Maple St., Lansing, MI 48906; 517/487-0883.  
**Pacer Center, Inc.** 3826 Chicago Ave. S, Minneapolis, MN 55417; 612/827-2966.  
**Computer Resource Center** 5025 Northrup, St. Louis, MO 63110; 314/776-1996.  
**Parents, Let's Unite for Kids** 1500 N. 30th St., Billings, MT 59101; 406/657-2055.  
**Carolina Computer Access Center** Metro School, 700 E. Second St., Charlotte, NC 28202; 704/342-3004.  
**Nevada Technology Center** 819 Las Vegas Blvd. S, Las Vegas, NV 89101; 702/382-3358.  
**Techspress, Center for Independent Living** 401 Columbia St., Utica, NY 13502; 315/797-4642.  
**Communication Assistance Resource Service** 3201 Marshall Rd., Dayton, OH 45429; 513/298-0803.  
**Computer and Technology Services (CATS)** 3241 N.E. 21st Ave., Portland, OR 97212; 503/246-8551.  
**Oregon Outback Technology Access Center** 10100 N. MacAlister Rd., Island City, OR 97850; 503/963-4106.  
**Technology Access Center** 2214 Metro Center Blvd., #110, Nashville, TN 37228; 615/248-6733.  
**East Tennessee Special Technology Access Center** University of Tennessee, Rm. 106-A, Knoxville, TN 37996; 615/584-4465.  
**West Tennessee Special Technology Resource Center**

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Service

**for the Disabled** 401 Maple St., P.O. Box 3683, Jackson, TN 38303.  
**Software Hardware Interlinking Peripherals (SHIP)** University United Methodist Church, 5084 De Zalvala Rd., San Antonio, TX 78249; 512/696-1033.  
**Computer Center for Citizens with Disabilities** 320 12th Ave., Rm. 114, Salt Lake City, UT 94103; 801/521-1624.

- 712 **atOnce** Layered; 617/242-7700, 800/622-4436.

B

- 713 **BIX** Byte Information Exchange; 800/227-2983.

C

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- 715 **CD Technology Porta-Drive** CD Technology; 408/432-8698.
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- 716 **CloseView** Apple Computer; 408/996-1010.
- 717 **ColorBoard 208** RasterOps Corp.; 408/562-4200, 800/468-7600.
- 718 **ColorBoard 264** RasterOps Corp.; 408/562-4200, 800/468-7600.
- 719 **ColorBoard 364** RasterOps Corp.; 408/562-4200, 800/468-7600.
- 720 **ColorCapture** Data Translation; 508/481-3700.
- 721 **ColorSnap-32** Computer Friends; 503/626-2291, 800/547-3303.
- 722 **ColorSpace Ili** Mass Microsystems; 408/522-1200, (continues)



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- 800/522-7979.
- 723 **ColorSpace FX** Mass Microsystems; 408/522-1200, 800/522-7979.
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- 794 **CE Software**; 515/224-1995.
- 795 **Connectivité Corp.**; 914/592-2853.
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- 798 **IdeAssociates**; 508/468-1155.
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- \* **Microsoft Corp.**; 206/882-8080, 800/426-9400.
- 800 **Mitem Corp.**; 408/559-8801.
- 801 **Novell**; 801/379-5900, 800/526-5463.
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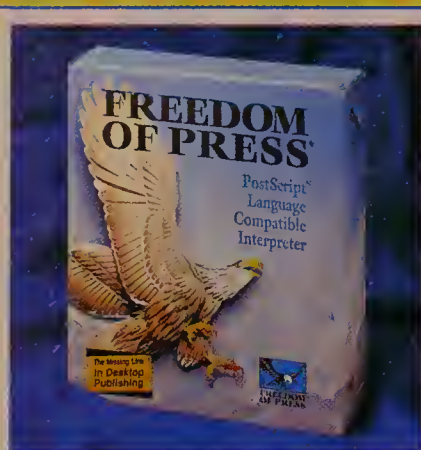


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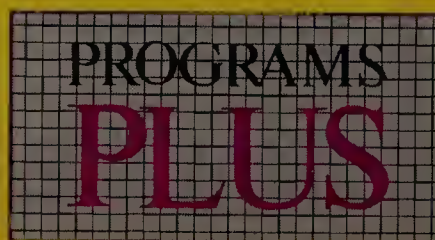


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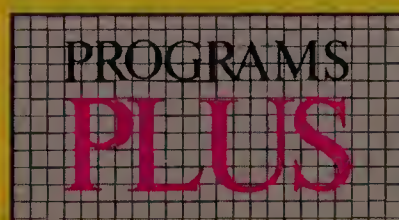
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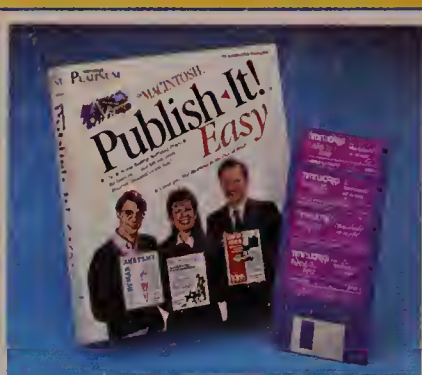
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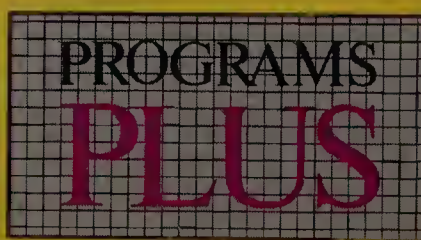


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<b>Zedcor</b> Desk.....	SPECIAL 225.

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<b>GDT Softworks</b>	
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JetLink Express.....	85.
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H P DeskWriter w/ATM.....	879.
<b>Koele Technologies</b>	
MacVision v3.0 (Digitizer).....	259.
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9CM080 Color Monitor 14".....	529.
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ThunderScan Plus ThunderWorks.....	199.
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<b>Freesoft</b>	
White Knight v.11.04.....	SPECIAL 85.
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Carbon Copy.....	SPECIAL 119.

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Mail Mac Server.....	245.

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### Synergy Software VersaTerm-Pro...

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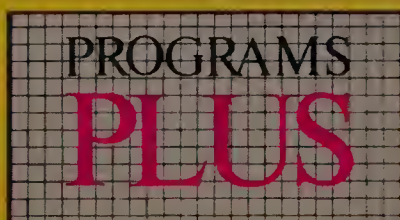
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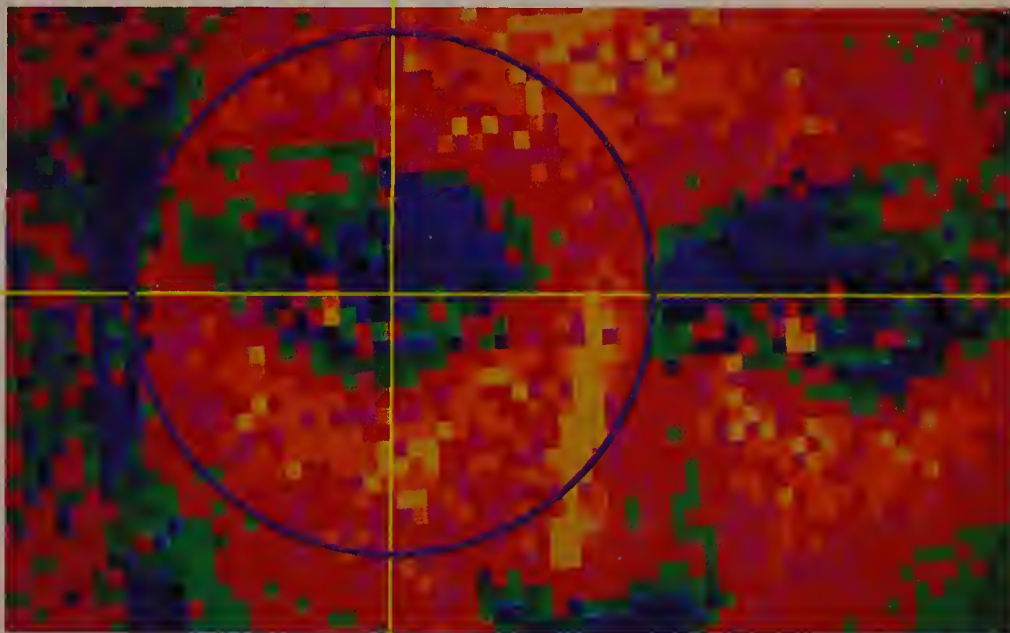
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Wednesday, Oct. 3  
Thursday, Oct. 4  
Friday, Oct. 5

## **Expo Hours**

10AM - 6PM  
10AM - 6PM  
10AM - 3PM

## **Registration**

8AM - 6PM  
8AM - 6PM  
8AM - 2PM

## **Event Site**

The San Jose Convention Facilities Complex.  
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## **Admission**

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- **Programmer/Developer Forums** for veteran and novice techies
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- 05. ☐ Business services
- 06. ☐ Professional (law/medicine)
- 07. ☐ Health services
- 08. ☐ Communications/publishing
- 09. ☐ Education
- 10. ☐ Government
- 11. ☐ Consultant
- 12. ☐ Other (specify)

### Your title

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- 14. ☐ Comptroller/treasurer/accountant
- 15. ☐ DP/MIS manager
- 16. ☐ Owner/partner
- 17. ☐ Engineer
- 18. ☐ Doctor/lawyer/dentist
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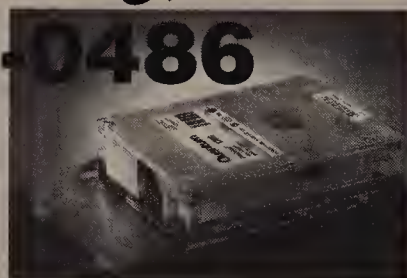
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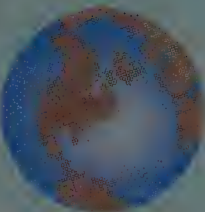
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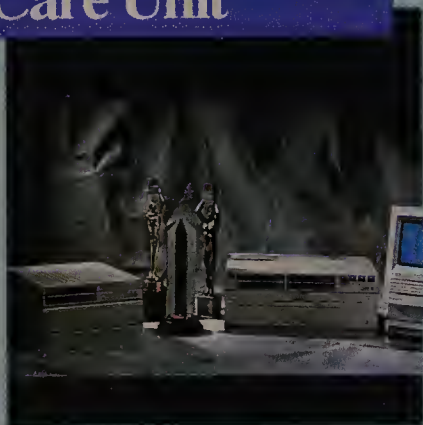
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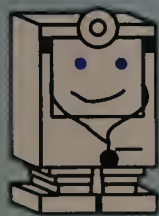
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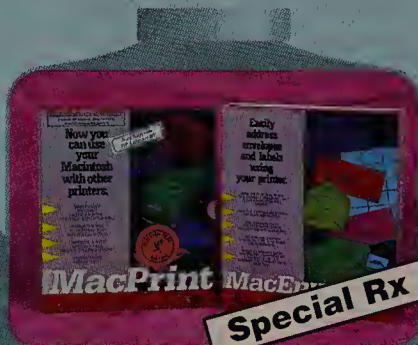
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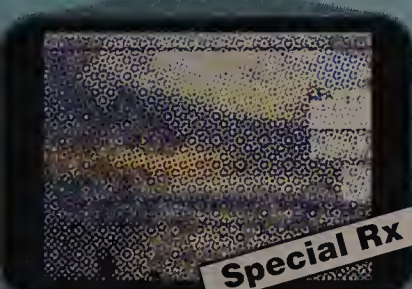
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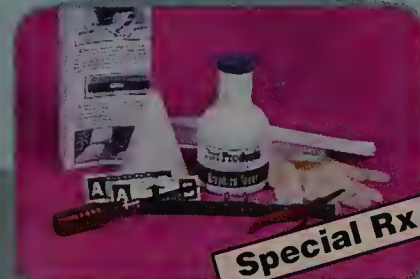
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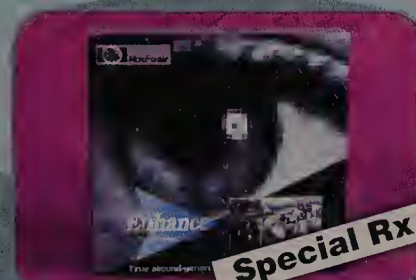
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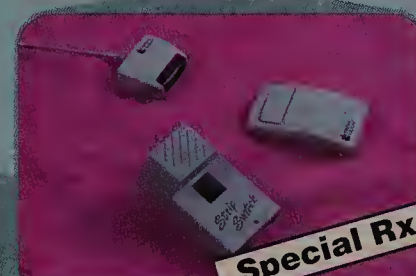
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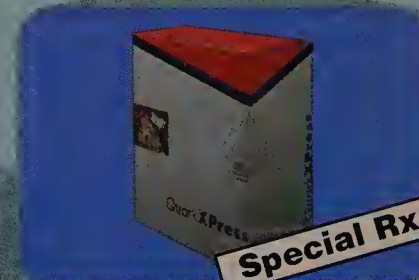
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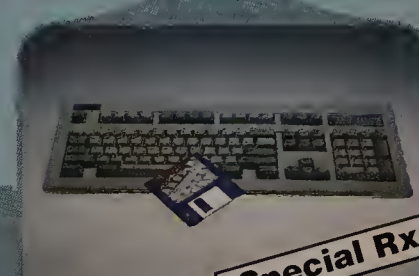
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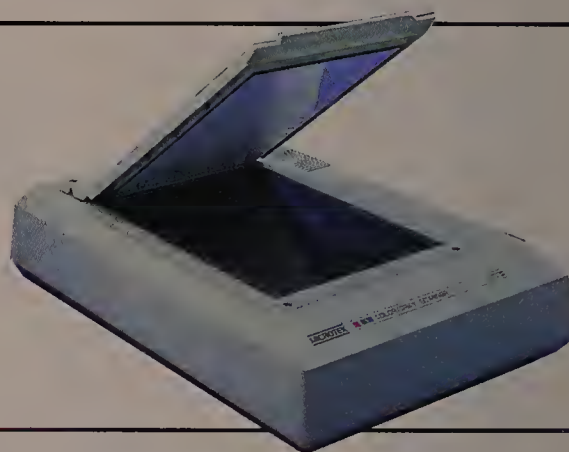
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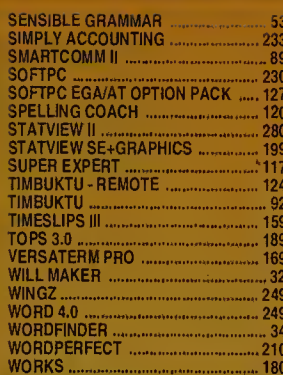
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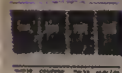




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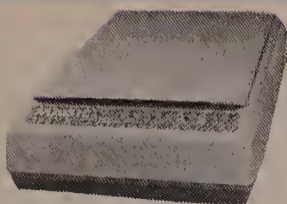


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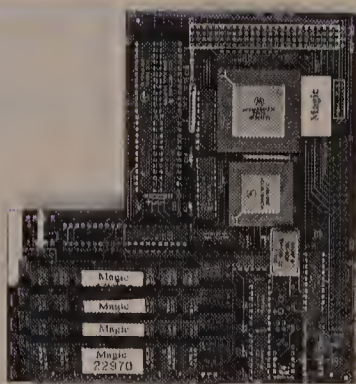


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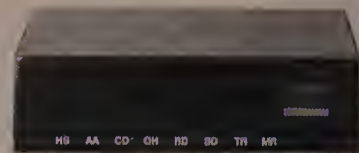
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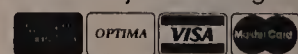
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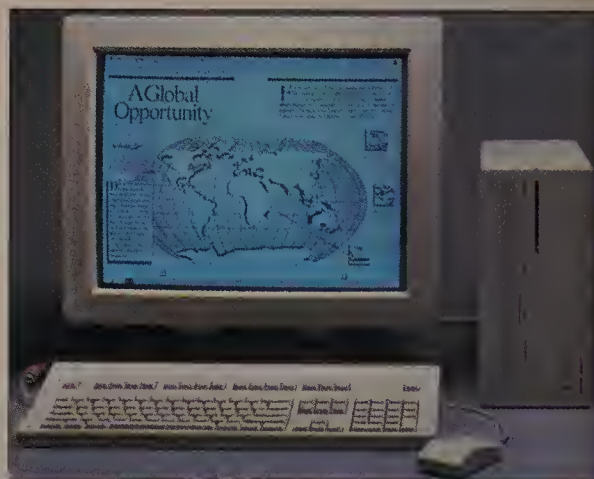
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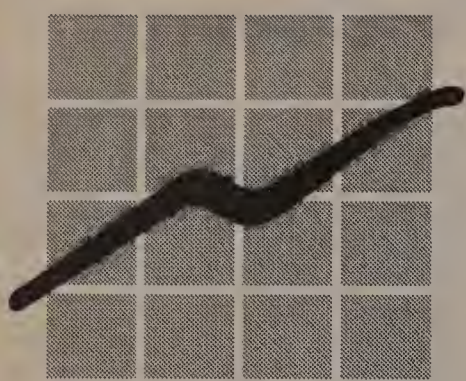


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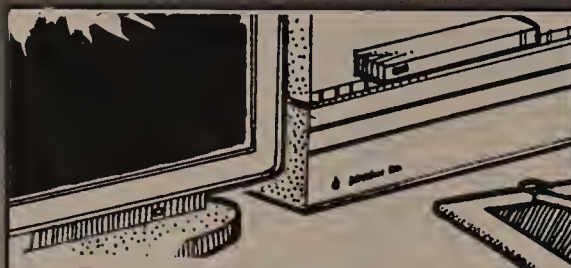
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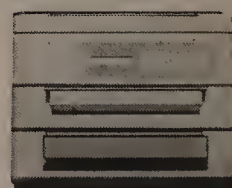
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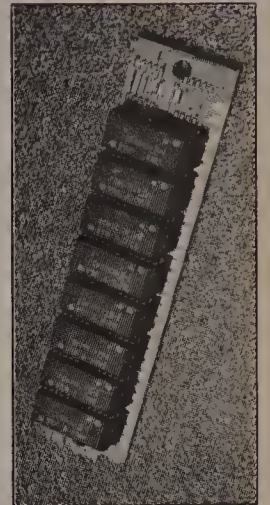
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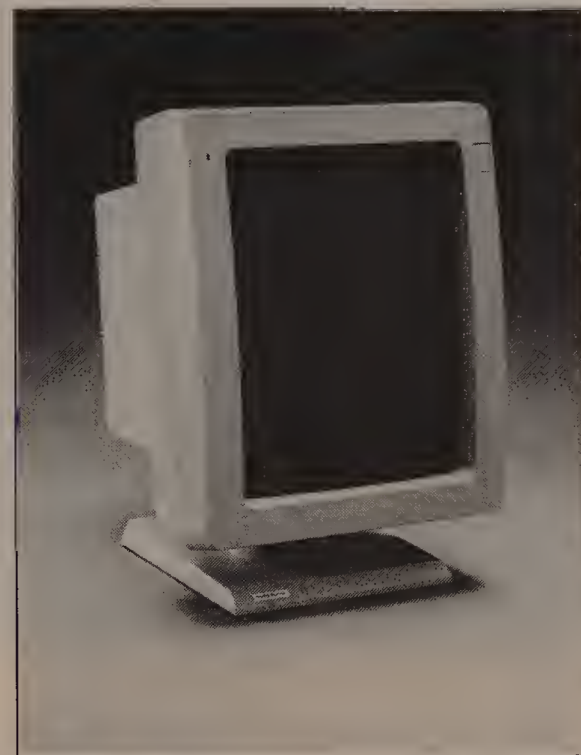
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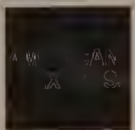
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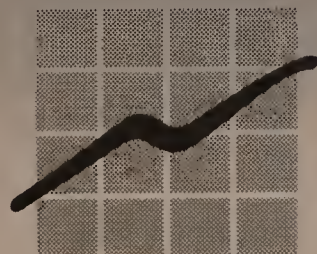
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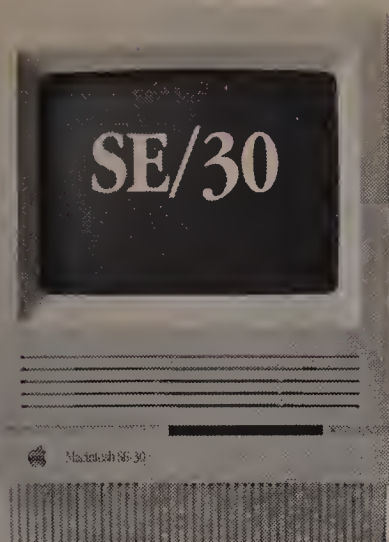
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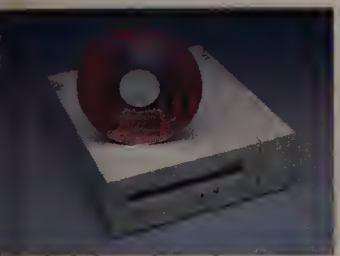




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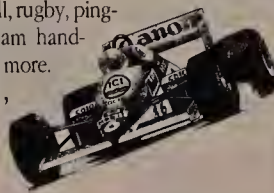
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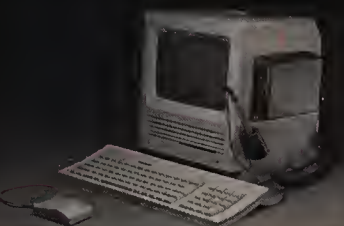


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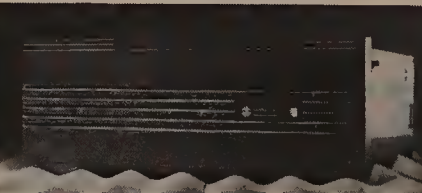
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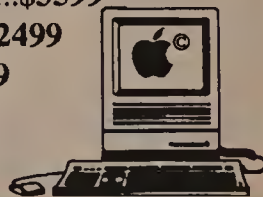
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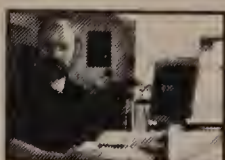
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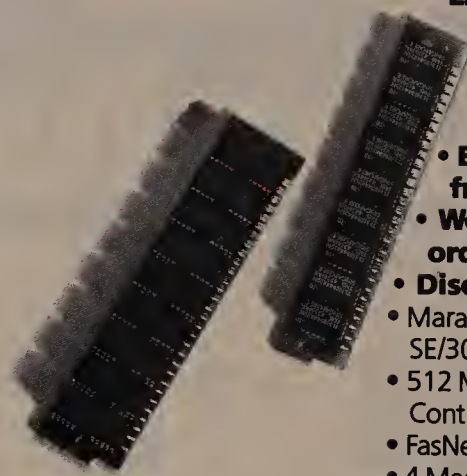
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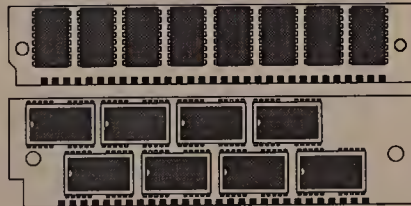


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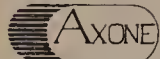
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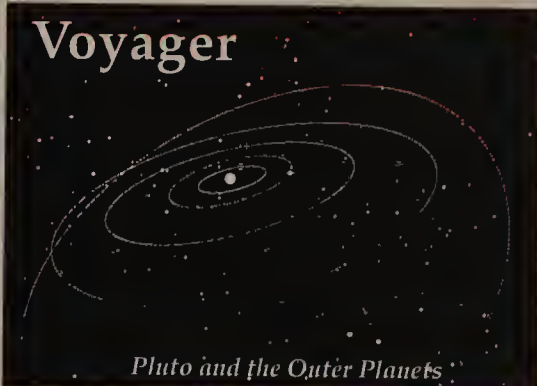
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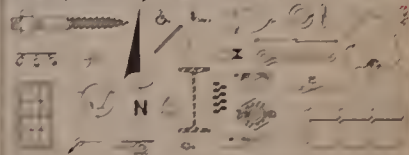
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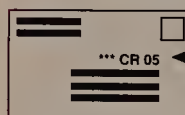
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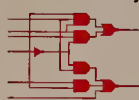
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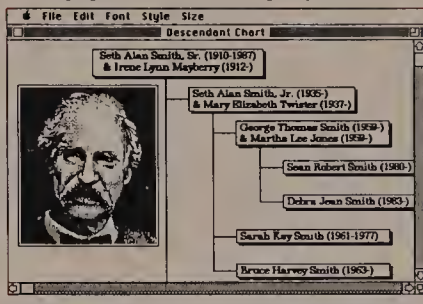


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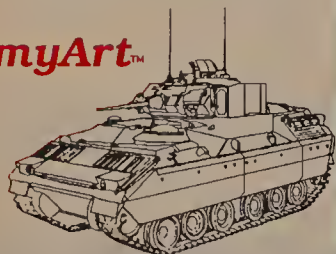
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Modem or Disk **2400 dpi**

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can't do  
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Qty.	Canvas	Hard Surface
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72	5.90 w/logo	7.15 w/logo
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Attractive, water re-  
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DOUBLE DENSITY  
100% ERROR FREE  
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• Mounts on Wall  
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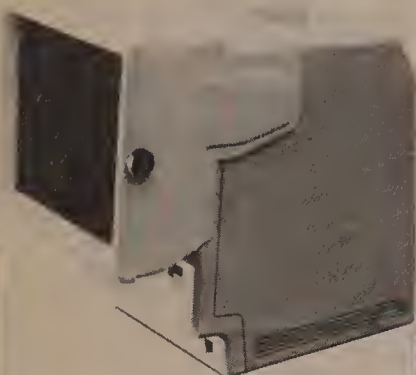
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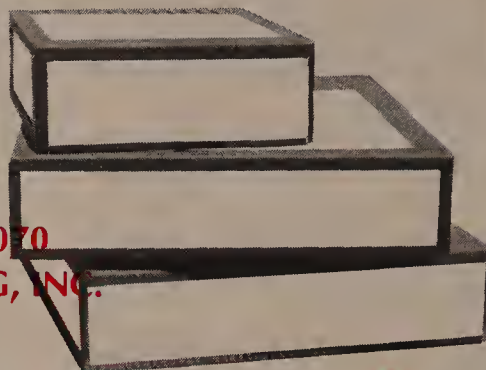
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Available in MacRed, MacIvory, or MacGrey



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## Deskette™

- Available in 1 to 16 drawer models (capacity: 72 to 1,152 3.5" diskettes)
- Available in Clear, Smoke, Black, & Fluorescent Green
- Soft rubber feet make Deskettes stackable and easy on the desktop
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## FREE CATALOG COMPUTER SECURITY PRODUCTS

• Theft Protection • Unauthorized Access/Use Control • Software Security

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200 QTY.

SONY or MAXELL	.59	3.5"
VERBATIM	.57	DS/DD
DATASAFE	.49	

SONY or TDK	1.69	3.5"
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3M or VERBATIM	.49	5.25"
BASF	.45	DS/DD
DATASAFE	.39	

BASF or VERBATIM	.69	5.25"
DATASAFE	.59	DS/HD

5.25" disks include sleeves.

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**PRINCETON**  
**DISKETTE**

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CIRCLE 563 ON READER SERVICE CARD

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On labels, tapes, disks, CD-ROM, or by modem



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CIRCLE 642 ON READER SERVICE CARD

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# BEST-SELLERS

Months on chart  
▼  
Last month  
▼  
This month  
▼

## BUSINESS SOFTWARE

64	1	1	<b>Microsoft Word</b>	Microsoft
43	4	2	<b>Microsoft Works</b>	Microsoft
55	2	3	<b>Microsoft Excel</b>	Microsoft
51	3	4	<b>Aldus PageMaker</b>	Aldus
16	5	5	<b>FileMaker II</b>	Claris
17	9	6	<b>QuarkXPress</b>	Quark
40	6	7	<b>MacWrite II</b>	Claris
49	—	8	<b>MacDraw</b>	Claris
8	10	9	<b>Wingz</b>	Informix
10	—	10	<b>Aldus FreeHand</b>	Aldus

## EDUCATION SOFTWARE

18	2	1	<b>Where in the World Is Carmen Sandiego?</b>	Brøderbund
31	1	2	<b>Reader Rabbit</b>	The Learning Company
5	5	3	<b>Where in the USA Is Carmen Sandiego?</b>	Brøderbund
9	4	4	<b>Math Rabbit</b>	The Learning Company
46	—	5	<b>Math Blaster</b>	Davidson & Associates

## ENTERTAINMENT SOFTWARE

7	2	1	<b>Tetris</b>	Spectrum HoloByte
9	1	2	<b>SimCity</b>	Maxis Software
43	—	3	<b>MacGolf</b>	XOR/PCAI
44	3	4	<b>Microsoft Flight Simulator</b>	Microsoft
1	—	5	<b>Welltris</b>	Spectrum HoloByte

## NETWORK/DATA COMMUNICATIONS

43	1	1	<b>TOPS</b>	Sitka Corporation
38	2	2	<b>AppleShare</b>	Apple Computer
44	—	3	<b>LocalTalk</b>	Apple Computer
11	—	4	<b>Netware for the Macintosh</b>	Novell
4	4	5	<b>MicroPhone II</b>	Software Ventures

Months on chart  
▼  
Last month  
▼  
This month  
▼

## HARD DISKS\*

22	—	1	<b>MacStack SD20</b>	CMS Enhancements
7	1	2	<b>MacStack SD40</b>	CMS Enhancements
2	4	3	<b>Platinum PI 40 External</b>	CMS Enhancements
1	—	4	<b>Micro/Stack 20 External</b>	MicroNet Technology
1	—	5	<b>Micro/Stack 46 External</b>	MicroNet Technology

## ADD-IN BOARDS/MEMORY

1	—	1	<b>Apple 8-bit Color Card</b>	Apple Computer
4	5	2	<b>Spectrum/8 Series III</b>	SuperMac Technology
33	1	3	<b>Radius Accelerator</b>	Radius
26	—	4	<b>Apple 1MB Expansion Kit</b>	Apple Computer
1	—	5	<b>Apple 2MB Expansion Kit</b>	Apple Computer

## UTILITY SOFTWARE

5	1	1	<b>SAM II</b>	Symantec
5	3	2	<b>SUM II</b>	Symantec
3	4	3	<b>Virex</b>	HJC Software
5	2	4	<b>Adobe Type Manager</b>	Adobe
1	—	5	<b>Pyro</b>	Fifth Generation Systems

## PRODUCT WATCH

Recent or forthcoming products of particular interest.

**Muse** *Occam Research*

Database that uses natural-language queries

**RadiusTV** *Radius*

Full-motion color TV display system

**Sky Shadow** *Casady & Greene*

Defender-like arcade game

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during May 1990.

\*Does not include hard disks installed at the factory.

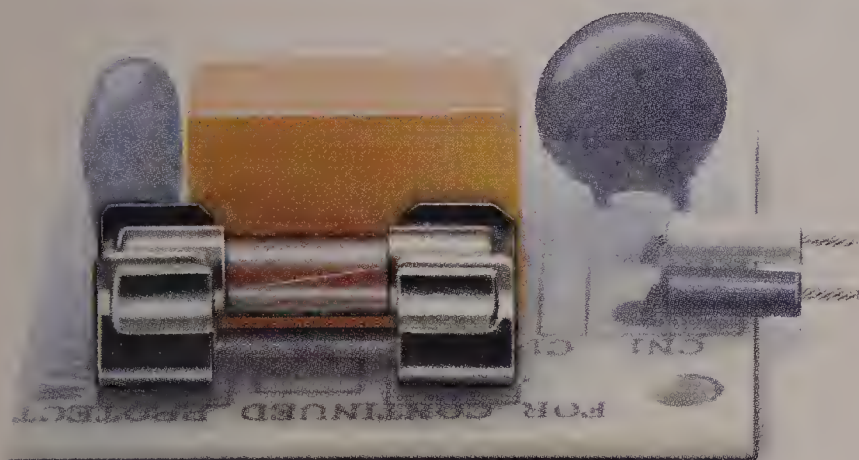




*Two power outlets enable users to turn on an entire system from the drive.*



*A fuse access latch for quick and easy repair of a faulty fuse.*



*Dual-fuse circuitry for protection against power surges.*

Since 1985, several hundred thousand Macintosh users have been interested in Ehman drives because of their attractive pricing. "Good product, great price and 30 days to change my mind," pretty much summed it up.

Until now.

Introducing the new Ehman E-Series of hard drives and removables. An enhanced line of products, loaded with features that bring you unsurpassed quality and reliability. The new enhancements include two power outlets that enable you to turn on your entire Mac system from your hard drive, and 50-pin cables that make daisy chaining a cinch. There's also a new, quieter fan that makes your Ehman drive *invisible* to the ear.

# Until



*A new, whisper-quiet fan for an improved work environment.*

## Introducing Th

Our new formatting software is simple, yet sophisticated. It's essentially the same software used by companies that charge twice as much for their hard drives. You'll notice this difference right away.

But other extras may not be so obvious. Our dual-fuse circuitry, for instance, provides a second buffer in the event of an electrical surge, while our new smart voltage switch means Ehman drives automatically operate on both international and domestic currents.

The new E-Series also offers enhanced ease of use and reliability. A completely redesigned user



# Now.

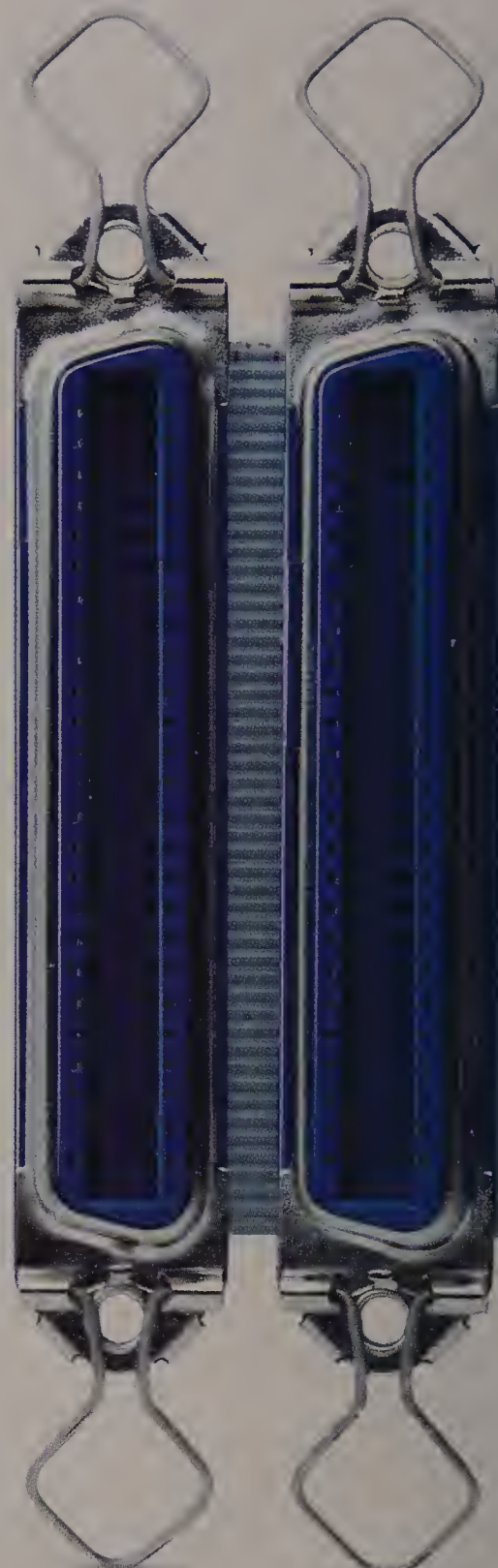


*An improved manual  
reduces learning time.*



*24-hour burn-in testing and improved quality control.*

*New  
formatting  
software  
for clarity,  
ease of  
installation  
and optimum  
performance.*



*50-pin connectors to link peripherals.*

## e New E-Series.

manual makes learning to use your drive a snap. And all of the new E-Series drives will be tested twice, including a final 24-hour, system burn-in check. And if something does go wrong, Ehman is still backing all of its products with a 30-day, no questions asked money-back guarantee.

Now, if you think all these new extras will cost you extra, think again. The price is the only feature we haven't changed. Our external drives still start below \$300 and our popular SyQuest removable is just \$649 including a cartridge.

Whatever your reason for buying our hard drives, price or quality, call your Ehman sales representative and order yours today.

<i>Hard Drives (MB)</i>	<i>Internal</i>	<i>External</i>
20 .....	\$249 .....	\$299
30+ .....	\$299 .....	\$349
40Q .....	\$379 .....	\$459
45 .....	\$329 .....	\$399
60+ .....	\$399 .....	\$449
80+ .....	\$449 .....	\$499
80Q .....	\$599 .....	\$649
105Q .....	\$649 .....	\$699
135 .....	\$749 .....	\$799
180 .....	\$849 .....	\$899
45 Removable .....		\$649

**Ehman**  
*The Apple Alternative*

**Seagate**

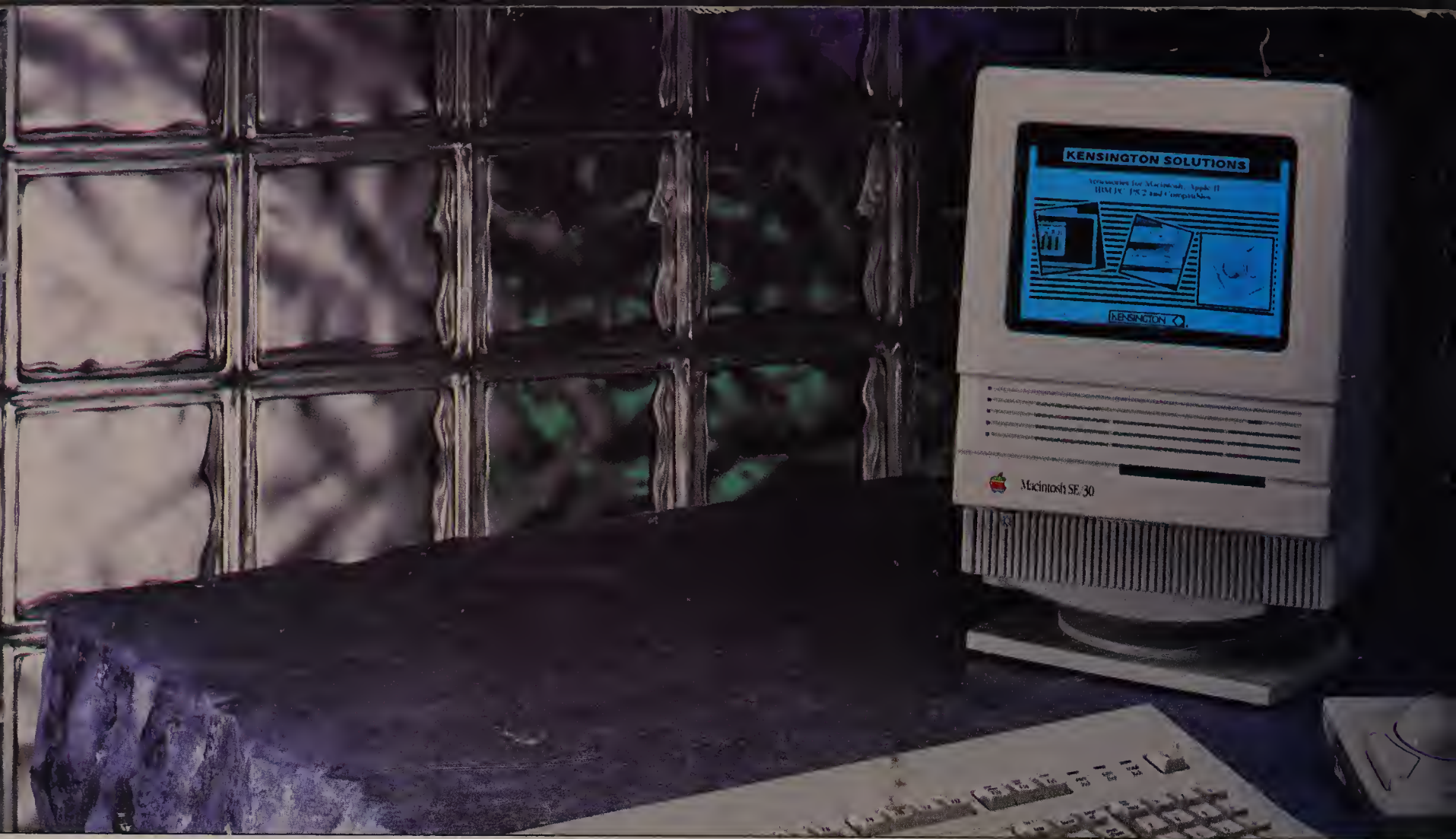
Call 1-800-257-1666  
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Circle 154 on reader service card



Affordability  
Has Always  
Been The Best  
Reason For  
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Hard Drives.





# EYESORE VS. EYE PROTECTION

As today's monitors get bigger and brighter, anti-glare filters become less of an option and more of a necessity.

The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

Yet, the irony is that something so good for your eyes can be such an eyesore.

In fact, most filters look like they belong to someone else's system.

The fit is sloppy. The colors don't match. The materials are different.

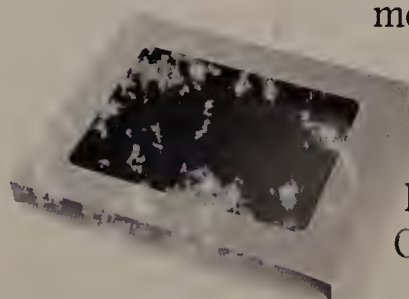
Kensington has a different idea.

Instead of making a filter that will fit on any monitor, we make filters

that will only fit a specific monitor.

An example is our Maccessories® SE Anti-Glare Filter.

It looks so much a part of the SE, you would think it was designed by the same people who designed the SE.



The styling is complementary. The color identical. Even the same material is used.

And unlike generic filters, the fit is perfect. So light passes through the filter, never around it.

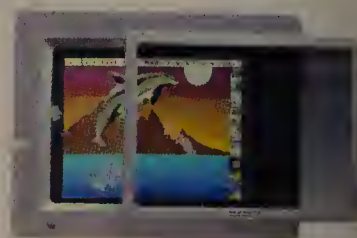
Kensington uses only optical quality glass with a ceramic anti-reflection and scratch-resistant coating.

The result is a 96% reduction in glare. And an improvement in contrast and clarity of up to 20 times.

In short, the most advanced eye-protection system you can find today—it even filters out VLF and ELF radiation and dissipates static.

Kensington has custom designed screens for the Mac, Mac Plus, Mac SE, Apple IIGS, as well as for the entire Mac II family of large screen monitors.

For a free brochure, and the dealer nearest you, call 800-535-4242. In New York call 212-475-5200.



See us at Macworld Booth 5312

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